Mathematics

Sindh Textbook Board, Jamshoro

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PREFACE

The Sindh Textbook Board is an organization charged with the preparation and publication of textbooks in the province of Sindh. Its prime objective is to develop and produce textbooks which are conductive to equip the new generation with the knowledge and acumen to prepare them to face the challenges of the rapidly changing environment. In this age of knowledge explosion and development of technology not witnessed in the human history, efforts have to be made to ensure that our children do not lag behind. The Board also strives to ensure that Universal Islamic Ideology, culture and traditions are not compromised in developing the textbooks.

To accomplish this noble task, a team of educationists, experts, working teachers and friends endeavor tirelessly to develop, text and improve contents, layout and design of the textbooks.

An attempt has made in this textbook to provide horizontal and vertical integration. The efforts of our experts and production personnel can bring about the desired results only if these textbooks are used effectively by teachers and students. Their suggestions will help us in further improving the qualitative contents of textbooks.

Chairman
Sindh Textbook Board

بسم اللہ الرحمن الرحیم

Unit 1

NUMBERS AND ARITHMETIC OPERATIONS

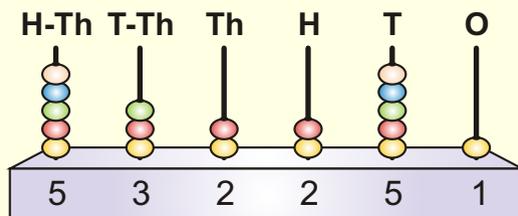
1.1 NUMBERS

In class III, we have learnt counting objects and writing of numbers up to hundred thousand on the basis of place value of numbers.

Let us revise

Example 1: Number "Five hundred thirty two thousand and two hundred fifty one" is written in figures as:

H-Th	T-Th	Th	H	T	O
5	3	2	2	5	1

In ball frame, it is represented.

500000 + 30000 + 2000 + 200 + 50 + 1 = **532251**

EXERCISE 1.1

1 Write the following numbers in figures.

(i) Four thousand six hundred and ninety two.

(ii) Sixty nine thousand and four hundred seven.

(iii) Four hundred fifty six thousand and nine hundred twenty six.

(iv) Seventy hundred thousand.

(v) Ninety hundred two thousand and forty two.

(vi) Seventy hundred twenty nine thousand and six.

2 Write the following numbers in words.

(i) 2561 (ii) 34561 (iii) 56081

(iv) 92000 (v) 245612 (vi) 349650

Identify place values of digits up to one hundred million

Place value chart for one million

That the smallest seven digit number is called one million,

i.e **1,000,000**

Place value chart for **1,000,000**

Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones
M	**H-Th**	**T-Th**	**Th**	**H**	**T**	**O**
1	0	0	0	0	0	0

Place value chart for ten million

Greatest seven digit number is 9,999,999
"Nine million, nine hundred ninety nine thousand and nine hundred ninety nine"

When we add 1 to 9,999,999, we get 10,000,000. Thus the number after 9,999,999 is 10,000,000 Read as "Ten Million"
i.e 9,999,999 + 1 = 10,000,000

Place Value Chart for 10,000,000

Ten Millions	Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones
1	0	0	0	0	0	0	0

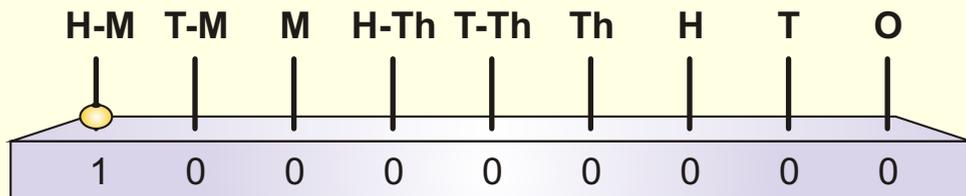
Place value chart for one hundred million

Greatest eight digit number is 99,999,999 , we read it as "Ninety nine million, nine hundred ninety nine thousand and nine hundred ninety nine".

When we add 1 to 99,999,999, we get 100,000,000
Read as "One Hundred Million"
i.e 99,999,999 + 1 = 100,000,000

The place value chart for 100,000,000

Hundred Millions	Ten Millions	Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones
1	0	0	0	0	0	0	0	0

Representation on the ball frame will be

Example 1:

Identify the place value of coloured digit in 2,5 46,789

M	H-Th	T-Th	Th	H	T	O
2	5	4	6	7	8	9

The place value of 5 is 5 hundred thousand = 500,000

Example 2:

Write place value of each digit in 37,209,854

T-M	M	H-Th	T-Th	Th	H	T	O
3	7	2	0	9	8	5	4

The place value of 3 is 3 ten million = **30,000,000**
The place value of 7 is 7 million = **7,000,000**
The place value of 2 is 2 hundred thousand = **200,000**
The place value of 0 is 0 ten thousands = **00,000**
The place value of 9 is 9 thousand = **9,000**
The place value of 8 is 8 hundred = **800**
The place value of 5 is 5 ten = **50**
The place value of 4 is 4 one = **4**

Teacher's Note Teacher should teach the concept of place value by using ball frame on the blackboard.

EXERCISE 1.2

1 Identify the place value of the coloured digit.

(i) 12,345,678 (ii) 58,923,107

(iii) 100,000,000 (iv) 23,964,579

(v) 25 ,960,2 38 (vi) 9,621,382

(vii) 8,9 98 ,776 (viii) 76,905,851

2 Write down the place value of every digit in the following numbers.

(i) 9,234,513 (ii) 50,120,306

(iii) 3,567,899 (iv) 36,564, 396

Read and write numbers up to one hundred million

In international system of units a number is split up into groups or periods. Each period consists of three digits.

The chart of periods and place values.

Millions			Thousands			Ones		
Hundred Millions	Ten Millions	Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones

Note: In reading a number, all the digits in the same period are read together along with its period (except the ones).

Commas are placed to separate the periods.

Reading and writing of a number "24,567,189"

Millions	Thousands	Ones
24	567	189

In words:

Example 1: Read and then write the given numbers in words.

(i) **3,671,289** **(ii)** **45,612,378** **(iii)** **10,202,000**

Solution:

(i) 3,671,289	Three million six hundred seventy one thousand and two hundred eighty nine.
(ii) 45,612,378	Forty five million six hundred twelve thousands and three hundred seventy eight.
(iii) 102,002,000	One hundred two million and two thousand

Example 2: Write numbers from one million one to one million fifteen in figures.

Solution:

1,000,001, 1,000,002, 1,000,003, 1,000,004, 1,000,005, 1,000,006, 1,000,007, 1,000,008, 1,000,009, 1,000,010, 1,000,011, 1000,012, 1,000,013, 1,000,014, 1,000,015.

Recognize numbers in words up to one hundred million

Nine digit numbers represent hundred millions such as 700,000,000, 850,000,000 and 710,999,999 read as “seven hundred million”, “eight hundred fifty million” and “seven hundred ten million, nine hundred ninety nine thousand and nine hundred ninety nine” respectively.

100,000,000 is read as (One Hundred Million), it is the smallest 9-digit number.

Example 1: Write 53816432 in expanded form.

50,000,000 + 3,000,000 + 800,000 + 10,000 + 6000 + 400 + 30 + 2

Or 5 ten millions + 3 millions + 8 hundred thousands +1 ten thousands + 6 thousands + 4 hundreds + 3 tens + 2 ones

We read it as fifty three million eight hundred sixteen thousand and four hundred thirty two.

Example 2: Separate numbers in millions, ten millions, and hundred millions from the following.

21,045,678, 100,000,000, 4,234,566, 2,005,127 and 55,566,677

Solution:

Millions	Ten Millions	Hundred Millions
4,234,566	21,045,678	100,000,000
2,005,127	55,566,677	—

EXERCISE 1.3

1 Read and then write the following numbers in words.

(i) 241,935 (ii) 4,312,687 (iii) 5,000,000

(iv) 25,134,564 (v) 100,000,000 (vi) 9,264,387

(vii) 50,001,000 (viii) 4,109,200 (ix) 99,990,090

2 **Write the following numbers in figures.**

(i) Two million ninety thousand and sixty eight.
(ii) Thirty million six hundred thousand and forty five.
(iii) One hundred million.
(iv) Twenty million and twenty.
(v) Ninety million and sixty seven thousand.

3 Write numbers from two million to two million twenty in figures.

4 **Write the missing numbers.**

(i) 2,450,761, 2,451,761, 2,452,761, _____, _____, _____,

(ii) 7,000,300, 7,000,400, 7,000,500, _____, _____, _____,

(iii) 67,213,415, 67,223,415, 67,233,415, _____, _____, _____,

5 **Separate numbers in millions, ten millions and hundred millions from the following.**

2,456,178, 22,233,341, 1,000,000, 10,000,000, 100,000,000, 2,561,000 and 20,001,010

Compare and order numbers up to 8-digits.

We already know the rules of comparing numbers.
Let us recall them

Rule 1: When we compare two numbers, the number with less number of digits is always less and a number with more digits is always greater.

Example: Compare the following numbers.

(i) 3,456,712 and 92,315,612
(ii) 60,123,000 and 9,999,999

Solution:

(i) 3,456,712 < 92,315,612 because 3,456,712 has less digits.
(ii) 60,123,000 > 9,999,999 because 60,123,000 has more digits.

Rule 2: Two numbers having same number of digits are equal if digits at corresponding positions are same.

Example: Compare 2,456,127 and 2,456,127

Solution: 2,456,127 = 2,456,127

- Both numbers have same number of digits.
- Write each number as the corresponding place value.
- We find digits at each position are same.

So, 2,456,127 = 2,456,127

Rule 3: If two numbers have same number of digits then we compare the different digits of the higher place values.

Example: Compare 24,513,105 and 24,367,999

Solution: Both are 8-digits numbers.

Process as given in the above example:

- First we compare digits of higher place value.

Teacher's Note Teacher should ensure enough practice by using the rules of comparison of numbers.

- Here the number have same digit 24 at million place.
- So, we compare next digit at hundred thousand place.
- Here 5 > 3 (Hundred thousands)

So, 24,513,105 > 24,367,999

Arranging numbers in orders:

Example: Arrange 5,671,231 , 341,267, 90,000,000 , 5,767,237. in ascending and descending orders.

Solution: Using the rules of comparison of numbers.

Ascending Order

341,267 , 5,671,231 , 5,767,237 , 90,000,000

Descending Order

90,000,000 , 5,767,237 , 5,671,231 , 341,267

EXERCISE 1.4

1 Compare the following numbers using symbols < , > and = respectively.

(i) 52,001,000 and 345,912

(ii) 2,456,123 and 24,345,611

(iii) 7,123,400 and 8,567,001

(iv) 92,333,444 and 92,315,617

(v) 24,000,008 and 24,000,005

2 Write the following numbers in ascending and descending orders.

(i) 3,174,215, 3,741,512, 3,076,005

(ii) 95,123,415, 95,312,415, 95,113,417

(iii) 59,178,215, 59,296,712, 52,111,222, 58,110,176

(iv) 14,111,920, 14,160,000, 13,200,415, 13,100,219

1.2 ADDITION

Add numbers up to 6-digits

We have learnt in class III to add numbers up to 4 digits.

Example: Add **8420** and **3910.**

Solution:

```
    ①
    8 4 2 0
  + 3 9 1 0
  ---------
Sum 1 2 3 3 0
```

So, **8420 + 3910 = 12330**

Example: Add **45093** and **3421.**

Solution:

```
      ①
    4 5 0 9 3
  +   3 4 2 1
  -----------
Sum 4 8 5 1 4
```

So, **45093 + 3421 = 48514**

Let us apply the addition rules to add numbers up to 6 digits.

Example 1: Add **85765** and **37071**

Solution:

Hence 85765 + 37071 = 122836

Teacher's Note

Teacher should give some more examples to the students for practice by changing digits at place values.

Example 2: Add **348754** and **343445**

Solution:

```
   ①①
   348754
 + 343445
 --------
   692199
 --------
```

So, 348754 + 343445 = 692199

EXERCISE 1.5

1. Solve the following.

(i)

```
   25431
 + 41245
 -------

 -------
```

(ii)

```
   92345
 + 50178
 -------

 -------
```

(iii)

```
   107236
 + 298017
 --------

 --------
```

(iv)

```
   349629
 + 201548
 --------

 --------
```

(v)

```
   964328
 + 428961
 --------

 --------
```

(vi)

```
   999555
 + 312016
 --------

 --------
```

2. Add the following.

(i) 24317 and 90235

(ii) 67999 and 249982

(iii) 392612 and 722334

(iv) 591023 and 942589

(v) 217640 and 921079

(vi) 555566 and 778896

(vii) 500983 and 645008

(viii) 910052 and 881223

Solve real life problems involving addition of numbers up to 6-digits

We do the addition of numbers up to 6-digits in our daily life in routine.

Example: There are **321876** female and **313589** male in a town. What is the total number of persons in the town.

Solution: Number of female = **321876**
Number of male = **313589**

Total number of male and female in the town = **635465**

	321876
	+ 313589
Sum	635465

EXERCISE 1.6

1. Government of Sindh spent Rs 581,034 on construction of one road and Rs 347,083 on another. Find the total amount spent in construction of both roads?
2. In an examination, 27,514 girls students were appeared and 20,328 boys students were appeared. What is the total number of students appeared in the examination?
3. Bismah purchased computers for Rs 857,600 and Aleesha purchased for Rs 641,200. What is the total amount they spent for purchasing computers?
4. In a two cricket match series Pakistan vs India, 55,384 people came to watch the first match at National Stadium Karachi and 43,298 people came for the second match in the Qaddafi Stadium Lahore. How many people came to watch the series in total?
5. A company manufactures 865271 bicycles and another company manufactures 725059 bicycles in a year. What is the total production of both companies in a year?
6. Pakistan Railways carried 347180 kg of mangoes in first week and 449130 kg mangoes in next week. How many kilograms of mangoes were carried altogether?

1.3 SUBTRACTION

Subtract numbers up to 6-digits

We have learnt in class III to subtract numbers up to 4 digits.

Example 1: Subtract **1374** from **2481**

Solution:

```
    2 4 8 1
  – 1 3 7 4
  ---------
    1 1 0 7
```

Difference 1107

Hence,
2481 – 1374 = 1107

Example 2: Solve **51432 – 40028**

Solution:

```
          2 12
  5 1 4 3 2
– 4 0 0 2 8
-----------
  1 1 4 0 4
```

Difference 11404

Hence,
51432 – 40028 = 11404

Example 3: Subtract **45912** from **85145**

Solution:

```
  T-Th Th  H  T  O
   (7) (14)(11)
   8    5  1  4  5
 – 4    5  9  1  2
 -----------------
   3    9  2  3  3
```

Step 1: Subtract ones
5 – 2 = 3 ones

Step 2: Subtract tens
4 – 1 = 3 tens

Step 3: Subtract Hundreds
1 - 9 H is not possible
make 1 H to 11 H by borrowing 1 from thousands. Now 11 – 9 = 2 H.

Step 4: Subtract Thousands.
After giving 1Th, 5Th becomes 4Th
So, 4Th - 5Th is not possible. Make 4Th to 14Th by borrowing 1 from Ten Thousands. Now 14Th - 5Th = 9Th.

Step 5: Subtract Ten Thousands
After giving 1 T-Th, to-Th
Now we have 7 T-Th
So, 7 – 4 = 3 T-Th

Hence **85145 – 45912 = 39233**

Teacher's Note

Teacher should solve some more examples by using the above mentioned rules in order to clear the concept of subtraction.

Example 4: Subtract **438905** from **557942**

Solution:

```
  ④⑰ ③⑫
  557942
– 438905
  119037
```

557942 – 438905 = 119037

EXERCISE 1.7

1 Solve the following.

(i)
```
  32164
– 20053
```

(ii)
```
  583729
–  21678
```

(iii)
```
  627948
–  16328
```

(iv)
```
  793854
– 185035
```

(v)
```
  790000
– 628453
```

(vi)
```
  894093
– 847141
```

2 Subtract the following:

(i) **43210** from **98765**

(ii) **39072** from **273194**

(iii) **99999** from **100000**

(iv) **537864** from **700000**

(v) **685439** from **874189**

(vi) **721059** from **751342**

(vii) **781500** from **871600**

(viii) **894354** from **994354**

(ix) **990001** from **991000**

(x) **184019** from **765129**

(xi) **853492** from **891400**

(xii) **493994** from **943002**

Solve real life problems involving subtraction of numbers up to 6-digits

We use subtraction of numbers in our daily life in routine. Let us understand the process by following example.

Example: There are **847385** chicken in a farm. From them **312793** were sold. Find the number of chicken remain in the farm.

Solution: Number of chicken = 847385
Number of chicken sold = 312793

So, there are **534592** chicken in the farm.

Difference

```
  847385
– 312793
  534592
```

EXERCISE 1.8

1. Government spent Rs 985,000 on renovation of two schools. If Rs 539,450 spent on one school, find the amount spent on the other school.
2. In an annual examination of grade IV 57,986 students appeared, from which 43,985 students passed. How many students failed in the examination?
3. Aslam and Atif invested Rs 658,700 in establishing cattle farm. Share of Aslam is Rs 385,780. What is the share of Atif?
4. Profit of a trading of cotton company in two months is Rs 320,000. If Rs 139,998 is profit in one month, find the profit in the other month?
5. On the first day of eid 3,955 people visited the zoo and on the second day 3,843 people visited. How many more people visited the zoo on first day of eid?
6. A poultry farm had 89,534 hens from which 43,294 hens died due to bird flu. Find the number of hens left in the poultry farm.

1.4 MULTIPLICATION

Multiply numbers up to 5-digits by numbers up to 3-digits

We have learnt in class III to multiply 2-digit numbers by 1-digit number. As we know that the process of multiplication is repeated addition.

Example : Multiply **24** by **3**.

Solution:

```
           2 4
         x   3
Product =  7 2
```

Hence **24 x 3 = 72**

Let us learn the process by following examples.

Example 1: Multiply **34251** by **32**.

Solution:

```
      3 4 2 5 1
          x 3 2
    -----------
      6 8 5 0 2
  + 1 0 2 7 5 3 x
  ---------------
    1 0 9 6 0 3 2
```

Step 1:
Multiply by 2 and write the numbers as their place value.

Step 2:
Put a cross on the ones place which indicate that we multiply the number with 3-tens.

Step 3:
(by Adding)

So, **34251 x 32 = 1096032**

Example 2:

Multiply **40329** by **123**

Solution:

```
        4 0 3 2 9
          x 1 2 3
        ---------
      1 2 0 9 8 7
      8 0 6 5 8 x
  + 4 0 3 2 9 x x
  ---------------
    4 9 6 0 4 6 7
```

So, **40329 x 123 = 4960467**

Example 3:

Multiply **23415** by **382**

```
        2 3 4 1 5
          x 3 8 2
        ---------
        4 6 8 3 0
    1 8 7 3 2 0 x
  + 7 0 2 4 5 x x
  ---------------
    8 9 4 4 5 3 0
```

So, **23415 x 382 = 8944530**

EXERCISE 1.9

1 Solve the following:

(i) 1632 x 23
(ii) 2341 x 70
(iii) 6314 x 52
(iv) 2109 x 84
(v) 51389 x 562
(vi) 43851 x 725
(vii) 65123 x 316
(viii) 74156 x 163

2 Multiply:

(i) 11689 by 100
(ii) 21499 by 120
(iii) 25701 by 553
(iv) 32145 by 152
(v) 41078 by 203
(vi) 12345 by 123
(vii) 54321 by 321
(viii) 89713 by 401

Solve real life problems involving multiplication

We do the multiplication of numbers in our daily life in routine. Let us understand the process by following example.

Example: A factory produce **28543** toffees in one shift. Find the number of toffees in **132** such shifts.

Solution:

```
      2 8 5 4 3    Toffees produced in one shift
      x   1 3 2    Number of shifts
    -----------
      5 7 0 8 6
    8 5 6 2 9 x
+ 2 8 5 4 3 x x
---------------
  3 7 6 7 6 7 6
```

So,
Total number of toffees are **3767676**

EXERCISE 1.10

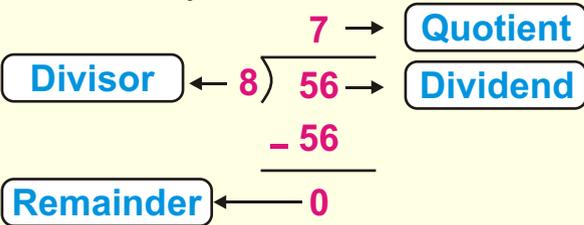
1. There were 5324 bottles of cold drinks loaded in a truck. How many bottles will be loaded in 132 trucks.
2. There are 630 students in a school. Each student pays Rs 1200 as monthly fees. How much fee is collected by the school in a month.
3. Price of a motorcycle is Rs 35800. Find the price of such 325 motorcycles.
4. A poultry farm produced 43290 eggs in a day. How many eggs will be produced in 400 days.
5. A town uses 45038 litres of water in a week. How much water will be used in 890 weeks.
6. A family spent Rs 15,980 to purchase food items for a month. What amount will be spent by 580 such families.

1.5 DIVISION

Divide numbers up to 4-digits by numbers up to 2-digits

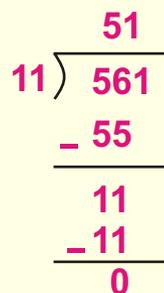
We have learnt in class III to divide 2-digit numbers by 1-digit numbers. We use division in daily life. It is repeated subtraction.

Example 1:

Divide **56** by **8**

Hence, **56** **8** = 7

Example 2:

Divide **561** by **11**

```
        51
   11 ) 561
      – 55
        11
      – 11
         0
```

Hence, **561** **11** = 51

Teacher's Note

Teacher should teach the division of numbers by the concept of repeated subtraction.

Example 3: Divide **975** by **15**

Solution:

Hence,
975 ÷ 15 = 65

Explanations

- We start division from the highest value digit.
- If it is less than the divisior, we join the next digit.
- So we get 97.
- We have to divide by **15**, so we count maximum of multiples of **15** which can be subtracted from **97** which is **6** because **15 x 6 = 90**. If we take **7** multiples then it will be **15 x 7 = 105**. which is greater than **97.** Write **90** below **97**. Subtract **90** from **97** as shown.
- We write **6** as quotient.
- Take down the next digit which is **5** and we get **75**. Now again repeat the process.

EXERCISE 1.11

1 **Solve the following:**

(i) 6744 ÷ 12 (ii) 3795 ÷ 15
(iii) 7293 ÷ 13 (iv) 9384 ÷ 12
(v) 2214 ÷ 18 (vi) 9944 ÷ 22

2 **Divide the following numbers and find quotient.**

(i) 4368 by 28 (ii) 8890 by 35
(iii) 5056 by 32 (iv) 6300 by 25
(v) 3920 by 16 (vi) 6642 by 18

3 Find the quotient and remainder when divisor is 35 and dividend is 5075.

4 What will be the quotient and remainder for 5696 as dividend and 16 as divisor.

5 If the divisor is 12 and dividend is 31035. Find the quotient and remainder.

6 Find the quotient and remainder if 9267 is divided by 15.

Solve real life problems involving division

We use the division of numbers in our daily life. Let us understand the process by the following example.

Example: 12 boxes of equal size contain **6816** toffees. How many toffees are there in each box.

Solution:

Number of toffees = **6816**
Number of boxes = **12**

Hence there are **568** toffees in each box.

EXERCISE 1.12

1. A cloth is 6272 metres long. If one suit takes 7 metres of cloth. How many suits can be made?
2. Monthly salary of 12 workers is Rs 7032. What will be the salary of one worker if they are taking same salary.
3. Asif spent Rs 2925 to buy 13 shirts of same price. What is the price of each shirt?
4. The weight of 16 sacks of flour is 4496 kg. What is the weight of each sack?
5. Price of 25 cricket bats is Rs 3075. What is the price of one bat?
6. One crate of bottles have capacity to put 36 bottles. How many crates required for 5616 bottles?

1.6 ADDITION, SUBTRACTION, MULTIPLICATION AND DIVISION

Use mixed operations of addition and subtraction and multiplication and division

Example 1: Solve: 86 – 34 + 62

Solution: As both addition and subtraction operations are involved in the question, we have to perform both operations one by one as:

or we can also solve as:

Solution 1:

86 – 34 + 62

= 86 + 62 – 34 (Changing the order)

= 148 – 34 | 86 + 62 = 148 |

= 114

Solution 2:

86 – 34 + 62

= | 86 – 34 | + 62

| 86 – 34 = 52 |

= | 52 + 62 | = 114

Example 2: Solve: $4 + 6 \div 2 \times 3$

Solution: Correct way

$= 4 + \boxed{6 \div 2} \times 3$ (Perform division first)

$= 4 + \boxed{3 \times 3}$ (Perform multiplication)

$= 4 + 9 = 13$

Wrong way

$= \boxed{4 + 6} \div 2 \times 3$

$= \boxed{10 \div 2} \times 3$

$= 5 \times 3 = 15$

Example 3: Solve: $3 \times 4 + 2$

Solution: As multiplication and addition both are involved in question, we have to perform multiplication then addition.

$3 \times 4 + 2 = \boxed{3 \times 4} + 2$

$= 12 + 2$

$= 14$

Example 4: Solve: $81 \div 9 + 34$

Solution: As division and addition both are involved in question, we have to solve the division then add.

$$81 \div 9 + 34 = \boxed{81 \div 9} + 34$$
$$= 9 + 34 = 43$$

EXERCISE 1.13

Solve the following:

(1)	$46 - 23 + 17$	(2)	$99 - 77 + 33$
(3)	$98 - 46 + 24$	(4)	$48 - 21 + 31$
(5)	$324 - 152 + 182$	(6)	$582 - 325 + 154$
(7)	$682 + 329 - 159$	(8)	$489 \div 5 + 393$
(9)	$253 \div 11 \times 5$	(10)	$540 \div 15 \times 8$
(11)	$992 \div 16 \times 4$	(12)	$7 \times 375 \div 15$
(13)	$12 \times 114 \div 19 + 10$	(14)	$23 + 800 \div 20 \times 2$
(15)	$32 \times 400 \div 16 + 23$	(16)	$451 \times 690 \div 30 - 15$

Solve real life problems (using Pakistani currency as well) involving addition, subtraction, multiplication and division.

Addition, Subtraction, Multiplication and Division:

Example 1: Sara spent Rs **486935** to buy a car and Rs **439870** to buy Jewellery. How much money she spent altogether?

Solution: To buy a car = Rs 486935 (carries: 1 1 1 1)

To buy Jewellery = Rs + 439870

Total amount spent by Sara. = Rs 926805

Example 2: There were 767513 people in a stadium to watch a football match. After break only 468302 people remained in the stadium. How many people left the stadium?

Solution: Number of people came 767513
remaining people − 468302
Number of people left the stadium 299211

Example 3: A company sold 856,940 fans in summer season and earned Rs 341 profit on each fan. Find the total profit.

Solution:

Number of fans 856940
Profit on each fan x 341

856940
3427760x
257082 0xx
292216540

Hence the company had profit of Rs 292,216,540.

Example 4: A shopkeeper sold 3,104 note books in 16 weeks. He sold exact number of note books in each week. How many note books sold in a week?

Solution:

Number of note books = **3104**
Number of weeks = **16**

$$\begin{array}{r} 194 \\ 16\,)\,3104 \\ -16 \\ \hline 150 \\ -144 \\ \hline 64 \\ -64 \\ \hline 00 \end{array}$$

Hence, 194 note books were sold in a week.

1. Cost of a car is Rs 748630 and the cost of another car is Rs 630010. What is the total cost of both cars?

2. Shagufta had Rs 389000 in her bank account. She spent Rs 183499 for repair of her house. How much amount is left with her?

3. A poultry farm sold 143860 chicken in a month and 354180 in next month. Find the difference in its sale.

4. The cost of a TV is Rs 95400. Find the cost of such 150 Tvs.

5. A farm contains 56321 trees of dates. How many date trees will be in 835 farms?

6. A school spent Rs 4375 on a picnic party. Only 35 students went to a picnic. What is the amount to be paid by each student?

7. Najeeb is distributing 3290 food packs among 235 families. How many food packs will each family get?

REVIEW EXERCISE

1. Tick the correct options.

(i) The place value of 8 in 2,485,612 is ____________

(a) 800 (b) 8000 (c) 80000 (d) 800000

(ii) Seven digit numbers represent ______________

(a) thousand (b) millions (c) ten millions

(d) hundred millions

(iii) 20 + 8 4 = ___________

(a) 4 (b) 7 (c) 8 (d) 22

2. Write the following numbers in words.

(i) 2,412,316 (ii) 36,123,101 (iii) 600,216

3. Write the following numbers in figures.

(i) Twenty million (ii) One hundred million

4. Add.

(i) 416,712 and 712,145 (ii) 900,102 and 812,156

5. Subtract.

(i) 218,822 from 967,829 (ii) 100,512 from 200,603

(iii) 555,666 from 723,444

6. Perform the following.

(i) 61243 x 261 (ii) 21588 x 120

(iii) 3810 15 (iv) 5088 32

(v) 565 15 x 2

7. The annual saving of Raheel is Rs 89,560. Out of which he purchases a T.V of Rs 35,000. How much amount is left with him?

2.1 DIVISIBILITY TESTS

Identify divisibility rules for 2 , 3 , 5 and 10

A divisibility test is a quick way of testing if a given number is divisible by another number without doing the division.

Find the divisors or factors of the numbers 2, 4, 5, 7, 9, 12, 18, 24, 32 and 48.

Number	Divisors or Factors
2	1, 2
4	1, 2, 4
7	
12	
18	
32	
48	

Every number is divisible by 1

Let us examine the numbers.

Example 1: Which of the following numbers is divisible by 2.

(i) 1456

Digit at units place is **6,** which is even.

So, **1456** is divisible by **2**

(ii) 92357

Digit at units place is **7,** which is odd.

So, **92357** is not divisible by **2**

Verification:

```
      4 6 2 6 8
2) 9 2 5 3 7
  –8
   1 2
  –1 2
     5
  –  4
     1 3
  –  1 2
       1 7
  –    1 6
          1
```

Note: Remainder is not 0
So, 92537 is not exactly divisible by 2.

A number is divisible by 2 , if ones digit is 0, 2, 4, 6 or 8

Example 2: Which of the following numbers is divisible by 3.

(i) 1452 (ii) 62345

Solution:

(i) 1452

Sum of digit is **1 + 4 + 5 + 2 = 12**

and **12** is divisible by **3**

So, **1452** is also divisible by **3**

Verification:

```
3) 1 4 5 2 (484
  -1 2
   ---
     2 5
    -2 4
     ---
     1 2
    -1 2
     ---
     0 0
```

(ii) 62345

Sum of digits **6 + 2 + 3 + 4 + 5 = 20**

and **20** is not divisible by **3**

So, **62345** is not divisible by **3**

Note: Remainder is not 0

So, 62345 is not divisible by 3.

Verification:

```
3) 6 2 3 4 5 (20748
  -6
  ---
   2 3
  -2 1
  ---
   1 4
  -1 2
  ---
   2 5
  -2 4
  ---
     1
```

Add the digits. If the result is divisible by 3, then the original number is also divisible by 3.

Example 3: Which of the following numbers is divisible by 5.

(i) 14673

14673 is not divisible by **5** because digit at unit place is not **0** or **5**

Verification:

```
       2 9 3 4
5) 1 4 6 7 3
  -1 0
  ---
   4 6
  -4 5
  ---
     1 7
    -1 5
    ---
     2 3
    -2 0
    ---
       3
```

Note: Remainder is not 0

So,14673 is not divisible by 5.

(ii) 31360

31360 is divisible by **5** because digit at ones place is **0**

Verification:

```
5) 3 1 3 6 0 (6272
  -3 0
  ---
   1 3
  -1 0
  ---
   3 6
  -3 5
  ---
   1 0
  -1 0
  ---
     0
```

A number divisible by 5, if the last digit is 0 or 5.

Example 4: Which of the following number is divisible by 10.
(i) 24563 (ii) 16230

Solution:

(i) 24563

24563 is not divisible by **10** because digit at ones place is not zero

Note: Remainder is not 0
So, 24563 is not divisible by 10.

(ii) 16230

16230 is divisible by **10** because digit at ones place is zero.

A number is divisible by 10, if last digit is 0.

Use divisibility tests for 2, 3, 5 and 10 on numbers up to 5-digits

Check the divisibility of 15381 by 2, 3, 5 and 10.

Solution:

(1) In 15381, the digit at ones place are not among 0, 2, 4, 6 and 8; therefore, 15381 is not divisible by 2.

(2) Now the sum of the digit in 15381 is: 1 + 5 + 3 + 8 + 1 = 18 as 18 is divisible by 3; therefore 15381 is divisible by 3.

(3) In 15381, the digit at ones place are not 0 and 5; therefore, 15381 is not divisible by 5.

(4) Also the digit at ones place is not ‘0’; therefore, 15381 is not divisible by 10.

Teacher’s Note Teacher should do enough practice of divisibility rules with the help of examples.

EXERCISE 2.1

1. Which of the following numbers are divisible by 2?

(i) **120** (ii) **1001** (iii) **1434** (iv) **2221** (v) **13574**

2. Test the following numbers for divisibility by 3.

(i) **135** (ii) **1471** (iii) **2100** (iv) **3331** (v) **31242**

3. Which of the following numbers are divisible by 5?

(i) **1235** (ii) **5552** (iii) **6035** (iv) **10001** (v) **53550**

4. Test the following numbers for divisibility by 10?

(i) **1350** (ii) **2225** (iii) **30500** (iv) **13575** (v) **20050**

5. Identify the numbers which are divisible by 5 and 10 both.

(i) **12000** (ii) **2145** (iii) **4040** (iv) **12345** (v) **7270**

6. Check the divisibility of following numbers by 2, 3, 5 and 10.

Numbers	Divisibility for 2	Divisibility for 3	Divisibility for 5	Divisibility for 10
405				
3354				
2340				
41220				
34329				

2.2 PRIME AND COMPOSITE NUMBERS

Define prime and composite numbers

Over 2000 years ago, a famous Greek Mathematician Eratosthenes, was interested in prime numbers. He arranged the numbers in 10 columns. Follow the steps he did to find out all the prime numbers between 1 and 100.

- '1' is a very special number, leave it as it is.
- Start with 2, circle it and cross out every 2nd number after it.
- Now move to 3, circle it and cross out every 3rd number after it.
- The next number that has not been circled or crossed out is 5, circle it now and cross out every 5th number.
- What is the next number after 5 that has not circled or crossed out? Circle that number and follow the same steps until you have all the numbers been crossed out or circled except 1.

The chart will look as under:

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Teacher's Note After teaching the concept of prime and composite numbers, teacher should ask the students oral questions.

The activity shows that:

All the numbers that have been circled 2, 3, 5, 7, etc.
are **Prime numbers**.
All the numbers that have been crossed out 4, 6, 8, 9, 12,14 etc.
are **Composite numbers**.
'1' is neither prime nor composite, it's a special type of natural number.

(a) Prime numbers:

A number which can be divided only by 1 or itself is called a prime number. Like 2, 3, 5 and 41 etc they can not be divided by any other number except 1 and the number itself.

There is only one prime number that is even, all the other prime numbers are odd.
What is that number?

(b) Composite numbers:

Those numbers (except 1) which have more than two divisors are called composite numbers.

Composite numbers can be written as a product of two or more prime numbers
10 = 5 x 2

For example: 4 can be divided by 1, 2 and 4.
18 can be divided by 1, 2, 3, 6, 9 and 18.
So, 4 and 18 are composite numbers.

Differentiate between prime and composite numbers

Number	Divisors	Result
37	1 and 37	Exactly two divisors: a prime number
42	1,2,3,6,14,21 and 42	More than two divisors: a composite number
19	1 and 19	Exactly two divisors: a prime number
77	1 , 7 , 11 and 77	Four divisors: a composite number

- A prime number has exactly 2 divisors
- A composite number has more than 2 divisors

EXERCISE 2.2

1. **Identify the prime numbers from the following.**

(i) **22** (ii) **41** (iii) **63** (iv) **51** (v) **81**
(vi) **119** (vii) **223** (viii) **1** (ix) **101** (x) **222**

2. **Identify the composite numbers from the following.**

(i) **34** (ii) **71** (iii) **163** (iv) **351** (v) **81**
(vi) **19** (vii) **23** (viii) **100** (ix) **18** (x) **135**

3. **Separate composite and prime numbers from following.**

41, 42, 43, 44, 45, 46, 47, 48, 49, 50,
51, 52, 53, 54, 55, 56, 57, 58, 59, 60.

4. Write down all the prime numbers between 1 and 20.
5. Write down all the composite numbers between 10 and 30.
6. Write down all the prime and composite numbers between 20 and 40.

2.3 FACTORS AND MULTIPLES

List factors of a number up to 50

1. Factors:

A factor divides a number completely with zero remainder.

Example 1:

Factors of 6 are 1 , 2 , 3 and 6
Factors of 12 are 1 , 2 , 3 , 4 , 6 and 12

The highest factor of every number is the number itself

Teacher's Note Teacher should also perform some activities of factors and multiples in the class.

Example 2: Write down all the factors of 9, 10, 15, 18, 42 and 50

Factors of 9 are 1, 3, and 9

Factors of 15 are 1, 3, 5 and 15

Factors of 10 are 1, 2, 5 and 10

Factors of 18 are 1, 2, 3, 6, 9 and 18

Factors of 42 are 1, 2, 3, 6, 7, 14, 21 and 42

Factors of 50 are 1, 2, 5, 10 and 25.

2. Multiples:

This biscuit costs Rs 2. For every biscuit you buy, the cost will go up by addition of 2. Costs will be Rs 2, Rs 4, Rs 6 and so on. So 2, 4, 6, 8 are few multiples of 2.

Example:

Cost of 1

2 x 1 = 2

Cost of 2

2 x 2 = 4

Cost of 3

2 x 3 = 6

So, 2, 4, 6, 8, . . . are multiples of 2

The multiplication that you learnt in previous classes, can help to find multiples of a number. The first few multiples of 2, 3, 4 and 5 are given below:

2 x 1 = 2	3 x 1 = 3	4 x 1 = 4	5 x 1 = 5
2 x 2 = 4	3 x 2 = 6	4 x 2 = 8	5 x 2 = 10
2 x 3 = 6	3 x 3 = 9	4 x 3 = 12	5 x 3 = 15
2 x 4 = 8	3 x 4 = 12	4 x 4 = 16	5 x 4 = 20

List the first twelve multiples of a 1-digit number

Example 1: List first twelve multiples of 8 and 6.

Solution:

First twelve multiples of 8 are
8, 16, 24, 32, 40, 48, 56, 64, 72, 80, 88 and 96

First twelve multiples of 6 are
6, 12, 18, 24, 30, 36, 42, 48, 54, 60, 66 and 72

Differentiate between factors and multiples

Multiples and Factors have to do with multiplying or dividing numbers.

EXERCISE 2.3

1. List the first twelve multiples of 4 , 7 and 9.
2. Write down all the factors of 16 , 26 and 45.
3. Circle all the multiples of 7 from the following numbers
   14 , 24 , 28 , 35 , 45 , 56 , 62 , 84 , 69
4. Write down all the multiples of 8 between 20 and 90.
5. Write all the factors of 50 between 10 and 30.

2.4 PRIME FACTORIZATION

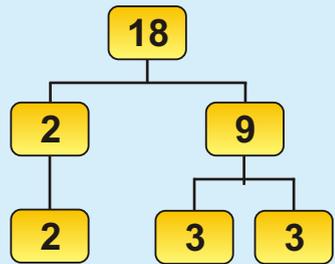
Factorize a number by using prime factors

The process of writing numbers as a product of its prime factors is called Prime Factorization.

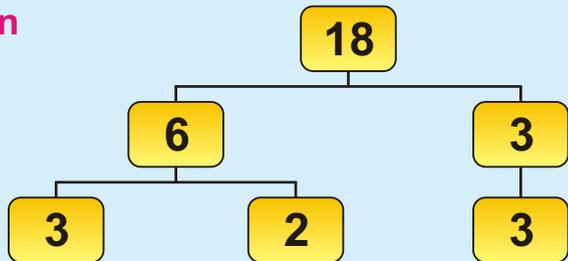
There are two prime factorization methods:

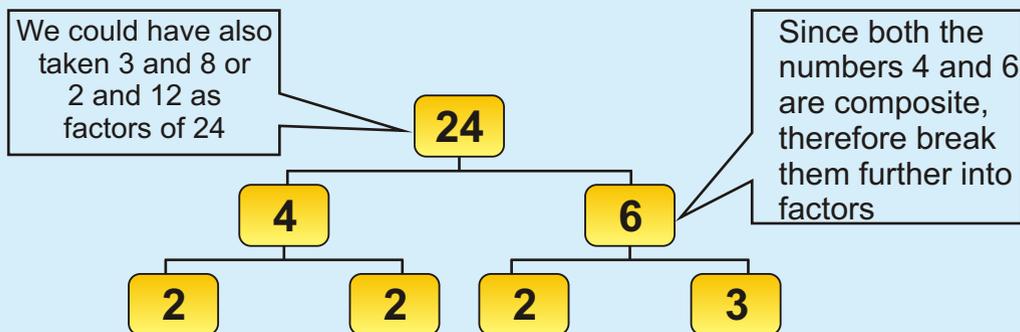
(1) Factor tree method (2) Division method

1. Factor tree method

Example 1: Factorize 18 into its prime factors.

Hence, we can write 18 = 2 x 3 x 3

where 2 and 3 are the prime factors of 18.

We could have also taken 3 and 6 as factors of 18

Hence we can write
3 x 2 x 3 = 18

Example 2: Factorize 24 into its prime factors.

Prime factors of 24 are 2, 2, 2 and 3.

2. Division method:

Example 1:

2	18	
3	9	Since, 2 x 9 = 18
3	3	Since, 3 x 3 = 9
	1	Since, 3 x 1 = 3

18 = 2 x 3 x 3

Example 2:

2	24	
2	12	Since, 2 x 12 = 24
2	6	Since, 2 x 6 = 12
3	3	Since, 2 x 3 = 6
	1	Since, 3 x 1 = 3

24 = 2 x 2 x 2 x 3

EXERCISE 2.4

1. **Write down all the factors of the following numbers and underline the prime factors.**

   (i) **12** (ii) **20** (iii) **25** (iv) **44** (v) **64** (vi) **28**

2. **Factorize the following numbers using the factor tree method.**

   (i) **36** (ii) **54** (iii) **27** (iv) **45** (v) **32** (vi) **82**

3. **Factorize the following numbers using the division method.**

   (i) **63** (ii) **45** (iii) **72** (iv) **54** (v) **38** (vi) **90**

2.5 HIGHEST COMMON FACTOR (HCF)

Determine common factors of two or more 2-digit numbers

Let us first list down the factors of any two numbers.

Example 1: Factors of 18 are: **1 , 2 , 3 , 6** , 9 and 18.

Factors of 24 are: **1 , 2 , 3** , 4 , **6** , 8 , 12 and 24

The common factors of 18 and 24 are 1 , 2 , 3 and 6 out of which '6' is the highest so, 6 is called the **Highest Common**

Find HCF of two or more 2-digit numbers using

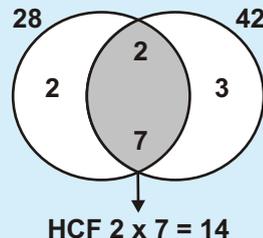
(i) Venn diagram (ii) Prime factorization

In order to find the Highest Common Factors of 2-digit numbers. Consider the following examples:

Factor of 18 and 24.

Example 1: Find the Highest Common Factor of 28 and 42 by using Venn diagram and prime factorization method.

1. Venn diagram

Let us find the prime factors of 28 and 42 by using Venn diagram.

2. Prime Factorization

Let us find the prime factors of 28 and 42 by using division method.

2	28
2	14
7	7
	1

2	42
3	21
7	7
	1

28 = 2 x 2 x 7
42 = 2 x 3 x 7 } → **Loop the common factors**

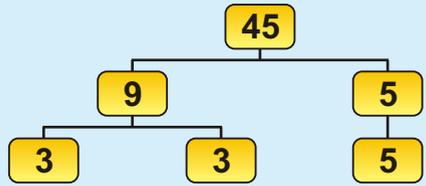
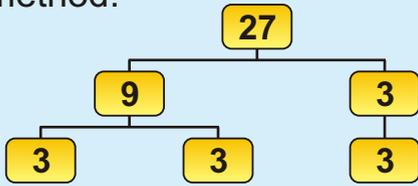
HCF = 2 x 7 = 14 → **Product of all the common factors**

Teacher's Note Teacher may use other set of numbers and develop the concept of finding HCF of numbers.

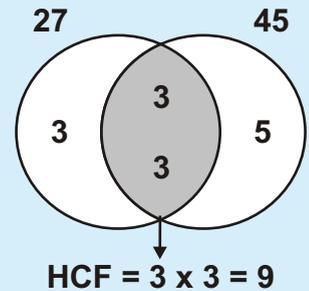
Example 2: Find the Highest Common Factor of 27 and 45 by using prime factorization method and Venn diagram.

By Prime Factorization

Let us find the prime factors of 27 and 45 by using factor tree method.

27 = 3 x 3 x 3
45 = 3 x 3 x 5

HCF = 3 x 3 = 9

By Venn diagram:

Let's find the prime factors of 27 and 45 by using Venn diagram.

EXERCISE 2.5

1. **Write down all the factors of the following pairs of numbers and loop the common factors.**
   (i) 12 and 18 (ii) 10 and 15 (iii) 22 and 44
   (iv) 8 and 32 (v) 36 and 30
2. **Find the HCF of the following numbers by Prime Factorization Method.**
   (i) 36 and 42 (ii) 28 and 42 (iii) 45 and 75
   (iv) 25 and 75 (v) 18 and 72 (vi) 32 and 64
   (vii) 60 and 90 (viii) 54 and 63 (ix) 44 and 99
3. **Find the HCF of the following numbers by Venn Diagram.**
   (i) 24 and 36 (ii) 63 and 54 (iii) 40 and 44
   (iv) 48 and 84 (v) 22 and 24

Solve real life problems involving HCF

Example 1: Two wires with lengths of 48 cm and 64 cm are to be cut into pieces of same length. Find the greatest possible length of the pieces.

Solution: We have to find the greatest of length in which each of wire can be divided. In order to find the greatest possible length of the pieces of each wire, we'll have to find the HCF of 48 and 64.

2	48
2	24
2	12
2	6
3	3
	1

2	64
2	32
2	16
2	8
2	4
2	2
	1

$48 = 2 \times 2 \times 2 \times 2 \times 2 \times 3$

$64 = 2 \times 2 \times 2 \times 2 \times 2 \times 2$

So, $HCF = 2 \times 2 \times 2 \times 2 = 16$

Hence, the greatest possible length of the piece of wire should be 16 cm in which each wire could be cut equally.

Example 2: There are 3 companies of 80, 112 and 144 scouts in a school. Find the highest number of scouts in which each team can be distributed equally.

2	80
2	40
2	20
2	10
5	5
	1

2	112
2	56
2	28
2	14
7	7
	1

2	144
2	72
2	36
2	18
3	9
3	3
	1

Therefore,

$80 = 2 \times 2 \times 2 \times 2 \times 5$

$112 = 2 \times 2 \times 2 \times 2 \times 7$

$144 = 2 \times 2 \times 2 \times 2 \times 3 \times 3$

So, $HCF = 2 \times 2 \times 2 \times 2$ **= 16**

Teacher's Note

Teacher may take other examples related to real life i.e number of hours spent in ploughing field, distance covered by the car, cost of crops produced by farmers, things sold by shopkeeper and clear the use of finding HCF.

EXERCISE 2.6

1. What is the maximum number of students among which Haider can distribute **36** sweets and **48** jelly to divide them equally?

2. Find the greatest number of bundles in which **18** books of Science or **24** books of Maths or **36** books of English can be arranged equally.

3. Two ribbons with the length of **44** m and **66** m are to be cut into pieces of same length. Find the greatest length of the piece of ribbon?

4. Mona has two pieces of tablecloth, one is **48** cm wide while the other is **90** cm wide. She wants to cut both pieces into strips of equal width. What should be the width of each strip?

5. A class teacher has **32** red balloons, **28** blue balloons and **20** green balloons. She wants to distribute balloons equally among the students. Find the equal number of balloons which could be distribute between students.

6. Zulfiqar has three containers containing **144**, **176** and **256** litres of coconut oil respectively. Find the capacity of the largest tin by which he can measure the oil exactly.

7. Ali visits the garden every **15** days and Azhar every **20** days. Ali and Azhar both meet today. After how many days they will meet in garden again?

2.6 LEAST COMMON MULTIPLE (LCM)

Determine common multiples of two or more 2-digit numbers

The multiples of any two numbers which are common in both the numbers are called common multiples.

Example 1:

Let's start with the numbers 4 and 6:

Solution:

Multiples of 4 are: 4 , 8 , **12** , 16 , 20 , **24** , 28 , 32 , **36** , …

Multiples of 6 are: 6 , **12** , 18 , **24** , 30 , **36** , 42 , 48 , 54 , …

The common multiples of **4** and **6** are **12** , **24** , **36** , …

There is no end to common multiples of any two numbers because multiples are not limited!!!

Example 2:

Determine first 4 common multiples of 8 and 12

Solution:

Multiples of 8 are: 8, 16, **24**, 32, 40, **48**, 56, 64, **72**, 80, 88, **96**, …

Multiples of 12 are: 12, **24**, 36, **48**, 60, **72**, 84, **96**, 108, …

We can see that that the first four common multiples of 8 and 12 are **24**, **48**, **72** and **96**.

Find LCM by (i) Common multiples (ii) Prime factorization

In order to find the least common multiple (LCM) of two numbers, consider the above examples:

In example 1, out of the common multiples of 4 and 6, the lowest is ***12*** , so ***12*** is the Least Common Multiple of 4 and 6.

Will the highest common multiple exist????

Similarly in example 2, out of the common multiples of 8 and 12, the lowest is **24** , so **24** is the Least Common Multiple of 8 and 12.

This method of finding LCM is called the **common multiples method.** The other method is **Prime factorization method.**

Example 1: Find the Least Common Multiple of 24 , 36 and 48 by prime factorization method.

Solution:

2	24
2	12
2	6
3	3
	1

2	36
2	18
3	9
3	3
	1

2	48
2	24
2	12
2	6
3	3
	1

24 = 2 x 2 x 2 x 3

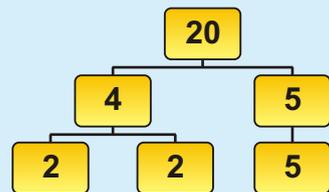
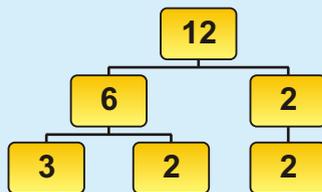
36 = 2 x 2 x 3 x 3

48 = 2 x 2 x 2 x 2 x 3

LCM must be divisible by all the numbers given

LCM = Product of common factors x all uncommon factors.

= 2 x 2 x 2 x 3 x 3 x 2 = **144**

Example 2 : Find the LCM of 18 and 24 using the Prime Factorization method.

EXERCISE 2.7

1. Find the LCM of the following numbers by common multiples method:

(i) 25 and 15 (ii) 12 and 14 (iii) 10 and 20

(iv) 6 and 9 (v) 7 and 5

2. Find the LCM of the following numbers by prime factorization method:

(i) 42 and 18 (ii) 15 and 36

(iii) 12 and 45 (iv) 35 and 15

(v) 20 and 48 (vi) 27 and 24

(vii) 45 and 63 (viii) 30 and 18

(ix) 24 and 46 (x) 22 and 48

Solve real life problems involving LCM

Example 1: Find the least number of oranges which can be equally distributed among 40, 50 or 60 children?

Solution: To find the least number of oranges, we have to find the LCM of 40, 50 and 60.

2	40, 50, 60
2	20, 25, 30
5	10, 25, 15
	2, 5, 3

Thus, the LCM is 2 x 2 x 5 x 2 x 5 x 3 = 600

So the required number of oranges is 600.

Example 2: Saad and Hamza want to cut pieces of rope 24 and 28 cm long each. Find the shortest possible length of rope which can be divided in the required measure between the both.

Solution: We need to find the shortest length of the rope from which the pieces of 24 cm or 28 cm, each can be cut into equal number of pieces. so, we have to find Lowest Common Multiple of 24, 28 cm.

2	24
2	12
2	6
3	3
	1

2	28
2	14
7	7
	1

24 = **2** x **2** x 2 x 3
28 = **2** x **2** x 7
LCM = 2 x 2 x 2 x 3 x 7 = 168
Hence, the shortest possible length of rope given to them was 168 cm.

EXERCISE 2.8

1. Find the least number of rows in which 35 or 70 or 80 plants can be planted equally.
2. On a jogging track, Jahangir completes the track in 30 minutes while Bilal completes the track in 25 minutes. If they both start at the same time, after how much they will be side by side together?
3. Malkani owns a vegetables shop. He has 27kg of onions, 36 kg of potatoes and 18 kg of tomatoes. What is the least weight of vegetables which he can put in a bag?
4. Find the capacity of the smallest container that can be filled completely by each of the buckets measuring 4, 6 or 9 litres respectively.
5. Find the length of the shortest rope that can be measured completely by either of the rods of length 20 centimetres or 25 centimetres.

REVIEW EXERCISE

1. Choose the correct answer:

(i) Which of the following number is divisible by 2?

(a) 567 (b) 484 (c) 257 (d) 193

(ii) Which of the following number is divisible by 3?

(a) 143 (b) 483 (c) 367 (d) 941

(iii) Which of the following number is divisible by 2 and 10 both?

(a) 4579 (b) 3921 (c) 4050 (d) 2108

(iv) What is the HCF of 39 and 52?

(a) 39 (b) 26 (c) 13 (d) 1

(v) What is the LCM of 48 and 66?

(a) 528 (b) 185 (c) 246 (d) 114

2. Find the HCF and LCM of 69 and 36?

3. What is the HCF and LCM of 37 and 41? Explain how you got your answer?

4. Mrs. Sayem wants to distribute 45 patties, 55 samosas and 75 juices equally. Find the greatest number of students among which these materials can be distributed equally.

5. Rida is arranging her birthday party in cafeteria. She wants to share 15 sandwiches or 30 slices of pizza to be equally distributed in each friend. Find the numbers of friends who could be invited at the party?

3.1 FRACTIONS

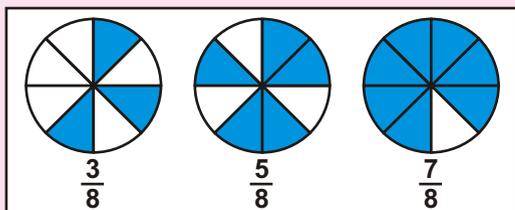
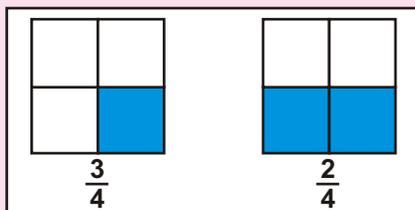
Define a fraction

Fraction is the part of a whole which is equally divided.

Examples: **Uncoloured parts of figures are shown in fraction and written in words.**

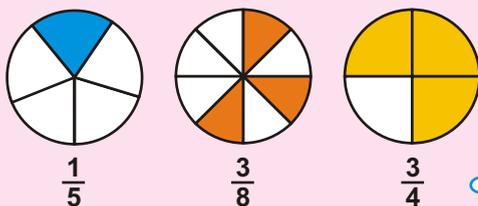
<u>Coloured</u>	<u>Uncoloured</u>
One Whole	One - Sixth $\frac{1}{6}$
One - Half $\frac{1}{2}$	One - Seventh $\frac{1}{7}$
One - Third $\frac{1}{3}$	One - Eighth $\frac{1}{8}$
One - Fourth $\frac{1}{4}$	One - Ninth $\frac{1}{9}$
One - Fifth $\frac{1}{5}$	One - Tenth $\frac{1}{10}$

Recognize like and unlike fractions

Look at the figures below:

Uncoloured

What do you observe?
One figure has been divided into equal parts.
The denominator in each case is the same.

A whole is divided into same number of parts.

They are called **Like fractions**.
Fractions having different denominators are called **Unlike fractions**.

For example coloured parts:

A whole is divided into different number of parts.

Are unlike fractions

Example: Separate the pairs of like and unlike fractions.

(i) $\frac{3}{4}, \frac{5}{7}$ (ii) $\frac{1}{5}, \frac{2}{5}$

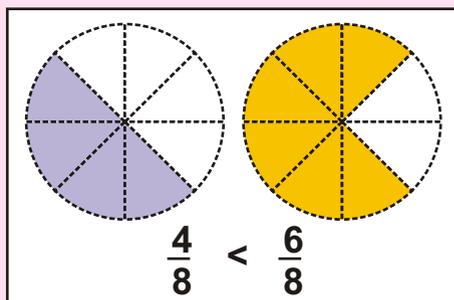
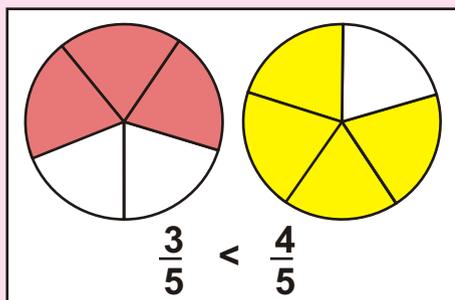
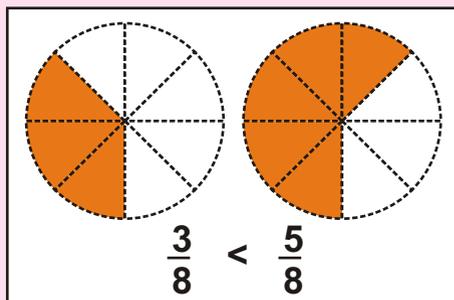
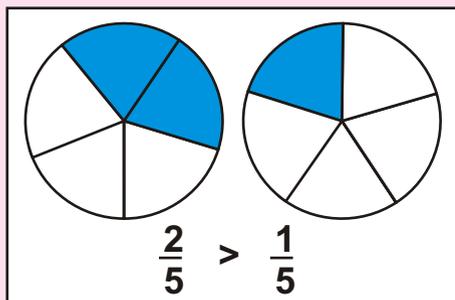
Solution:

Like fraction pair: $\frac{1}{5}, \frac{2}{5}$

Unlike fraction pair: $\frac{3}{4}, \frac{5}{7}$

Compare two unlike fractions by converting them to equivalent fractions with the same denominator.

In the previous class you have learnt how to compare like fractions. Let us recall how you did that?

Compare fractions represented by coloured portion.

> In case of like fractions, just look at the numerator, fraction with greater number represents greater value!

Examples:

$\frac{8}{9} > \frac{5}{9}$, $\frac{7}{11} > \frac{2}{11}$, $\frac{1}{16} < \frac{5}{16}$, $\frac{2}{7} < \frac{5}{7}$

We can compare unlike fractions as well.

Example:

How would you know whether $\frac{3}{4}$ is less than or greater than $\frac{4}{7}$

Solution:

Convert these fractions into equivalent fractions having same denominator.

Equivalent fractions are obtained by multiplying the numerator and denominator by same number. It does not change the value of fraction !!!

LCM of 4 and 7 is 28

Now we make denominators same

$$\frac{3}{4} = \frac{3 \times 7}{4 \times 7} = \frac{21}{28}$$

$$\frac{4}{7} = \frac{4 \times 4}{7 \times 4} = \frac{16}{28}$$

Now they are like fractions,
so just compare the numerators.

Here,

$$\frac{21}{28} > \frac{16}{28}$$

So, $\frac{3}{4} > \frac{4}{7}$

REMEMBER!

- Take the LCM of denominators
- Multiply the numerator and denominator by the same number to convert the denominator into LCM

Arrange fractions in ascending and descending order

Example 1:

Arrange the following sets of fractions in ascending and descending order.

$\frac{6}{7}$, $\frac{2}{7}$, $\frac{1}{7}$ and $\frac{3}{7}$

Solution: $\frac{6}{7}$, $\frac{2}{7}$, $\frac{1}{7}$, $\frac{3}{7}$

Since they are like fractions, compare the numerators

Ascending order:

$\frac{1}{7}$, $\frac{2}{7}$, $\frac{3}{7}$, $\frac{6}{7}$

Descending order:

$\frac{6}{7}$, $\frac{3}{7}$, $\frac{2}{7}$, $\frac{1}{7}$

Just reverse the ascending order

Example 2: Compare $\frac{5}{9}$ and $\frac{4}{5}$

Solution:

LCM of 5 and 9 is 45

So, $\frac{5}{9} = \frac{5 \times 5}{9 \times 5} = \frac{25}{45}$ We make the denominator of both fractions 45

And $\frac{4}{5} = \frac{4 \times 9}{5 \times 9} = \frac{36}{45}$ So, we compare numerators 25 and 36

Because, $25 < 36$

So, $\frac{5}{9} < \frac{4}{5}$

Example 3: Write the following fractions in both ascending and descending order.

$\frac{2}{9}$, $\frac{5}{6}$, $\frac{7}{12}$ and $\frac{1}{3}$

Solution:

Since they are unlike fractions, we will first have to convert them into equivalent fractions.

STEP 1: Take the LCM of denominators
(LCM of 9, 6, 12 and 3 is 36)

STEP 2: Multiply numerator and denominator by the same number to get the LCM in the denominator.

$\frac{2 \times 4}{9 \times 4} = \frac{8}{36}$, $\frac{5 \times 6}{6 \times 6} = \frac{30}{36}$, $\frac{7 \times 3}{12 \times 3} = \frac{21}{36}$, $\frac{1 \times 12}{3 \times 12} = \frac{12}{36}$

Or $\frac{8}{36}$, $\frac{30}{36}$, $\frac{21}{36}$, $\frac{12}{36}$

Now it is easier to arrange by looking at the numerators,

Ascending order:

$$\frac{8}{36}, \frac{12}{36}, \frac{21}{36}, \frac{30}{36}$$

If the denominators are same, greater the numerator, larger the value of the fraction.

Or $$\frac{2}{9}, \frac{1}{3}, \frac{7}{12}, \frac{5}{6}$$

Descending order:

$$\frac{5}{6}, \frac{7}{12}, \frac{1}{3}, \frac{2}{9}$$

Simplify fractions to the lowest form

Fractions can be reduced to lowest form by dividing numerator and denominator by the same number.

Example 1: **Simplify:** $\frac{30}{45}$

Solution: $\frac{30}{45}$ → Both the numbers can be divided by 3

$$\frac{30 \quad 3}{45 \quad 3} = \frac{10}{15}$$ → They can still be divided by 5

As each of the numerator and denominator can be divided by 1 only hence.

Also $$\frac{10}{15} = \frac{10 \quad 5}{15 \quad 5} = \frac{2}{3}$$ → Now STOP

↓

Because 2 and 3 cannot be divided further by the SAME NUMBER

So, $$\frac{\overset{10}{\cancel{30}}}{\underset{15}{\cancel{45}}} = \frac{\overset{2}{\cancel{10}}}{\underset{3}{\cancel{15}}} = \frac{2}{3}$$ where $\frac{2}{3}$ is the lowest form.

Teacher's Note Teacher should teach the students about the ascending and descending orders of fractions by using LCM.

EXERCISE 3.1

1. From the following pairs of fractions, identify like and unlike pairs.

(i) $\frac{2}{7}$ and $\frac{6}{7}$ (ii) $\frac{2}{9}$ and $\frac{2}{15}$ (iii) $\frac{8}{17}$ and $\frac{7}{17}$

(iv) $\frac{3}{10}$ and $\frac{6}{11}$ (v) $\frac{7}{11}$ and $\frac{7}{10}$ (vi) $\frac{1}{4}$ and $\frac{3}{4}$

(vii) $\frac{4}{13}$ and $\frac{13}{15}$ (viii) $\frac{11}{19}$ and $\frac{16}{19}$ (ix) $\frac{77}{27}$ and $\frac{4}{27}$

2. Fill in the blank boxes with “<” or “>” or “=” by first converting the fractions into like fractions.

(i) $\frac{3}{8}$ ☐ $\frac{3}{8}$ (ii) $\frac{5}{6}$ ☐ $\frac{4}{9}$ (iii) $\frac{7}{12}$ ☐ $\frac{1}{4}$

(iv) $\frac{2}{7}$ ☐ $\frac{13}{14}$ (v) $\frac{6}{15}$ ☐ $\frac{3}{10}$ (vi) $\frac{9}{11}$ ☐ $\frac{16}{22}$

3. Arrange the following fractions in ascending order.

(i) $\frac{6}{7}, \frac{9}{7}, \frac{5}{7}$ (ii) $\frac{5}{6}, \frac{2}{3}, \frac{5}{9}$

(iii) $\frac{2}{5}, \frac{1}{3}, \frac{4}{15}$ (iv) $\frac{5}{12}, \frac{4}{8}, \frac{3}{4}, \frac{1}{6}$

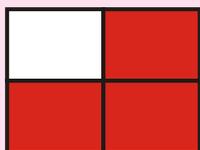
(v) $\frac{9}{8}, \frac{7}{2}, \frac{13}{6}, \frac{5}{4}$ (iv) $\frac{5}{12}, \frac{7}{6}, \frac{7}{4}, \frac{5}{2}$

4. Simplify the following fractions into their lowest form.

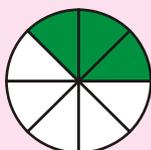
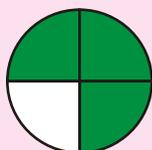
(i) $\frac{24}{32}$ (ii) $\frac{18}{27}$ (iii) $\frac{30}{50}$ (iv) $\frac{14}{42}$ (v) $\frac{33}{66}$

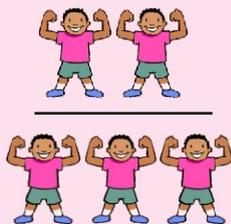
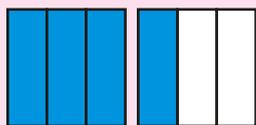
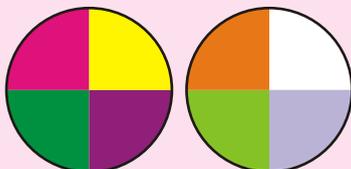
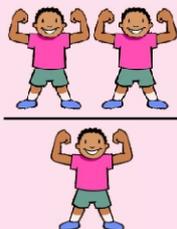
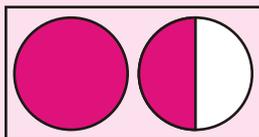
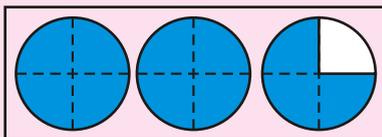
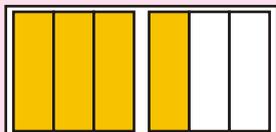
3.2 TYPES OF FRACTION

Identify unit, proper, improper and mixed fractions

Unit Fractions — Numerator is always equal to one.

$\frac{1}{2}$ $\frac{1}{5}$ $\frac{1}{4}$

Numerator is equal to 1

Proper Fractions — Numerator is less than the Denominator.

$\frac{1}{5}$ $\frac{3}{8}$ $\frac{3}{4}$

They are less than 1

Improper Fractions — Numerator is greater than or equal to the Denominator.

They are greater than 1

$\frac{3}{3} + \frac{1}{3} = \frac{4}{3}$ $\frac{4}{4} + \frac{3}{4} = \frac{7}{4}$

Mixed Fractions

Convert improper fraction to mixed fraction and vice versa

Example 1: Mixed to Improper

$$3\frac{2}{5} = ?$$

5 x 3 = 15 (Multiply whole number by the denominator)

15 + 2 (Add the sum with numerator)

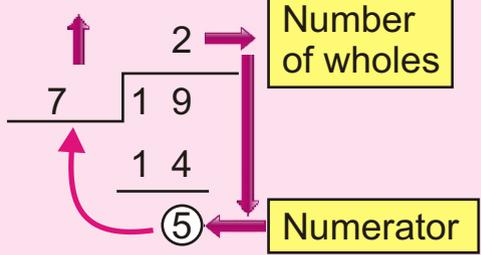
= 17 → Numerator

So,

$$3\frac{2}{5} = \frac{17}{5}$$

While converting a mix fraction into improper fraction. Denominator never changes!

Improper to Mixed

$$\frac{19}{7} = ?$$

$$\frac{19}{7} = 2\frac{5}{7}$$

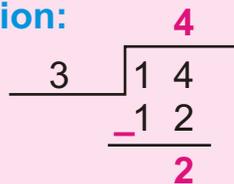
Example 2: Convert $5\frac{1}{2}$ into improper fraction.

Solution: $5\frac{1}{2}$

2 x 5 + 1
10 + 1 = 11
$5\frac{1}{2} = \frac{11}{2}$

Example 3: Convert $\frac{14}{3}$ into mixed fraction.

Solution:

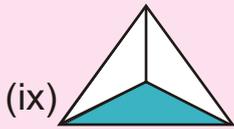
```
     4
3 | 1 4
  - 1 2
  -----
      2
```

So, $\frac{14}{3} = 4\frac{2}{3}$

EXERCISE 3.2

1. Identify which of the following are unit, proper, improper or mixed fractions?

(i) $\frac{1}{3}$ (ii) $\frac{1}{4}$ (iii) $\frac{19}{4}$ (iv) $\frac{1}{7}$

(v) $\frac{5}{9}$ (vi) $2\frac{1}{8}$ (vii) $\frac{4}{3}$ (viii)

(ix) (x)

2. Convert the following improper fractions into mixed fractions.

(i) $\frac{43}{7}$ (ii) $\frac{29}{4}$ (iii) $\frac{74}{9}$ (iv) $\frac{14}{6}$

(v) $\frac{28}{5}$ (vi) $\frac{67}{3}$ (vii) $\frac{85}{11}$ (viii) $\frac{86}{5}$

3. Express the following mixed fractions as improper fractions.

(i) $4\frac{3}{10}$ (ii) $5\frac{2}{3}$ (iii) $6\frac{1}{2}$ (iv) $3\frac{2}{7}$

(v) $8\frac{1}{4}$ (vi) $1\frac{11}{13}$ (vii) $7\frac{7}{8}$ (viii) $2\frac{6}{7}$

3.3 ADDITION AND SUBTRACTION OF FRACTIONS

In the previous class, you have learnt how to add and subtract like fractions, let us recall that.

Example 1: **Add:** $\frac{2}{7} + \frac{3}{7}$

Solution:

$$\frac{2}{7} + \frac{3}{7} = \frac{5}{7}$$

Example 2: **Solve:** $\frac{7}{11} - \frac{4}{11}$

Solution:

$$\frac{7}{11} - \frac{4}{11} = \frac{3}{11}$$

Solve.

$\frac{3}{7} + \frac{5}{7} = \square$ $\frac{4}{5} - \frac{2}{5} = \square$

$\frac{2}{9} + \frac{3}{9} = \square$ $\frac{9}{15} - \frac{8}{15} = \square$

$\frac{5}{7} + \frac{1}{7} = \square$ $\frac{7}{15} - \frac{4}{15} = \square$

$\frac{6}{10} + \frac{3}{10} = \square$ $\frac{7}{12} - \frac{6}{12} = \square$

$\frac{5}{12} + \frac{2}{12} = \square$ $\frac{8}{14} - \frac{5}{14} = \square$

$\frac{7}{11} + \frac{2}{11} = \square$ $\frac{13}{17} - \frac{4}{17} = \square$

Add fractions with unlike denominators

Example 1: Add $\frac{2}{3} + \frac{5}{6}$

Solution: We will first have to convert these fractions into like fractions by taking the LCM of denominators.

$$\frac{2}{3} = \frac{2 \times 2}{3 \times 2} = \frac{4}{6}$$

Using the equivalent fractions method

$$\frac{2}{3} + \frac{5}{6}$$ → LCM is 6

$$= \frac{4}{6} + \frac{5}{6}$$ → Now add the numerators

$$= \frac{9}{6} = \frac{3}{2} = 1\frac{1}{2}$$

Always keep your answer in lowest form

Teacher's Note

Teacher should put emphasis on the use of LCM in addition and subtraction of fractions with unlike denominators.

Example 2: Add $1\frac{3}{5} + 2\frac{1}{10}$

Solution:

$$1\frac{3}{5} + 2\frac{1}{10} = \frac{8}{5} + \frac{21}{10}$$

$$= \frac{8 \times 2}{5 \times 2} + \frac{21 \times 1}{10 \times 1}$$

$$= \frac{16}{10} + \frac{21}{10} = \frac{16 + 21}{10}$$

$$= \frac{37}{10}$$

$$= 3\frac{7}{10}$$

Verify the commutative property of addition of fractions with same denominators

When we add two fractions, the change in order will not affect the result. It'll remain the same. This is known as commutative property of fractions of addition.

Example : Verify $\frac{4}{17} + \frac{9}{17} = \frac{9}{17} + \frac{4}{17}$

Solution: Verification

$\frac{4}{17} + \frac{9}{17}$	=	$\frac{9}{17} + \frac{4}{17}$
$= \frac{4+9}{17}$		$= \frac{9+4}{17}$
$= \frac{13}{17}$	Result is same	$= \frac{13}{17}$

So, $\frac{4}{17} + \frac{9}{17} = \frac{9}{17} + \frac{4}{17}$

We see while adding order does not matter.

Verify the associative property of addition of fractions with same denominators

According to this property, when we add **three** fractions, the change in order will not affect the result. It'll remain the same.

Example : Verify: $\frac{2}{9} + \left(\frac{4}{9} + \frac{7}{9}\right) = \left(\frac{2}{9} + \frac{4}{9}\right) + \frac{7}{9}$

Verification:

$\frac{2}{9} + \left(\frac{4}{9} + \frac{7}{9}\right)$ ← = → $\left(\frac{2}{9} + \frac{4}{9}\right) + \frac{7}{9}$

$= \frac{2}{9} + \frac{11}{9}$ $\qquad$ $= \frac{6}{9} + \frac{7}{9}$

$= \frac{13}{9}$ ← Result is same → $= \frac{13}{9}$

So, $\frac{2}{9} + \left(\frac{4}{9} + \frac{7}{9}\right) = \left(\frac{2}{9} + \frac{4}{9}\right) + \frac{7}{9}$

Subtract fractions with unlike denominators

We know that while subtraction of fractions with same denominator (like fractions) only numerators are subtracted and denominator of the difference remains the same, as of the given fraction.

Example 1: Subtract: $\frac{5}{8} - \frac{1}{2}$

Solution: $\frac{5}{8} - \frac{1}{2}$

Writing equivalent fractions, $\frac{1}{2}$

so, we get $\frac{1 \times 4}{2 \times 4} = \frac{4}{8}$

So, $= \frac{5}{8} - \frac{1}{2}$

$= \frac{5}{8} - \frac{4}{8}$

$= \frac{5-4}{8} = \frac{1}{8}$

Or

$\frac{5}{8} - \frac{1}{2}$

Find the LCM of 8 and 2

$= \frac{5\text{x}1-1\text{x}4}{8}$

$= \frac{5-4}{8}$

$= \frac{1}{8}$

2	8, 2
2	4, 1
2	2, 1
	1, 1

LCM = 2x2x2 = 8

Example 2: **Simplify** $3\frac{3}{4} - 1\frac{1}{6}$

Solution: $3\frac{3}{4} - 1\frac{1}{6}$

> Change to Improper Fractions and then find the LCM of denominators.

$$3\frac{3}{4} - 1\frac{1}{6} = \frac{15}{4} - \frac{7}{6} = \frac{15 \times 3 - 7 \times 2}{12}$$

$$= \frac{45 - 14}{12} = \frac{31}{12} = 2\frac{7}{12}$$

EXERCISE 3.3

1. Add the following fractions.

(i) $\frac{2}{3} + \frac{11}{9}$ (ii) $\frac{7}{6} + \frac{1}{2}$

(iii) $\frac{8}{10} + \frac{1}{2} + \frac{2}{4}$ (iv) $\frac{3}{4} + \frac{1}{2} + \frac{4}{6}$

(v) $3\frac{1}{2} + 5\frac{1}{3}$ (vi) $5\frac{1}{3} + 2\frac{3}{4}$

(vii) $\frac{2}{3} + 1\frac{1}{5} + \frac{3}{2}$ (viii) $2\frac{1}{7} + \frac{2}{5} + 1\frac{1}{7}$

2. Subtract the following fractions.

(i) $\frac{5}{6} - \frac{1}{2}$ (ii) $\frac{7}{8} - \frac{3}{4}$ (iii) $\frac{4}{5} - \frac{1}{3}$

(iv) $3\frac{3}{10} - 1\frac{1}{4}$ (v) $9\frac{1}{2} - 3\frac{1}{5}$ (vi) $\frac{4}{5} - \frac{1}{10} - \frac{2}{15}$

3. Apply commutative and associative property of addition to fill in the blanks.

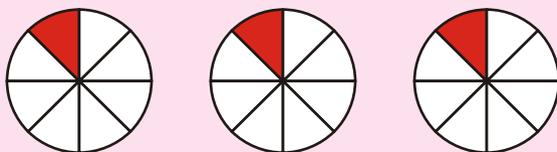
(i) $\frac{3}{5} + \frac{7}{4} = \dots\dots + \frac{3}{5}$ (ii) $\frac{2}{9} + \dots\dots = \frac{4}{7} + \dots\dots$

(iii) $\frac{1}{3} + \left(\frac{1}{5} + \frac{1}{4}\right) = \left(\frac{1}{3} + \dots\dots\right) + \frac{1}{4}$

(iv) $\frac{3}{10} + \left(\dots\dots + \frac{4}{5}\right) = \left(\dots\dots + \frac{2}{7}\right) + \frac{4}{5}$

3.4 MULTIPLICATION OF FRACTIONS

Multiply fractions with whole numbers

Consider the diagram

Shaded part in each figure represents $\frac{1}{8}$ fraction. These shaded parts are $\frac{3}{8}$ altogether.

Or $\frac{1}{8} + \frac{1}{8} + \frac{1}{8} = \frac{3}{8}$

This can be written as

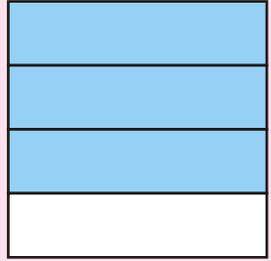
$$3 \times \frac{1}{8} = \frac{3}{8}$$

3 is the same as $\frac{3}{1}$

In multiplying a whole number with a fraction, multiply the whole number with the numerator

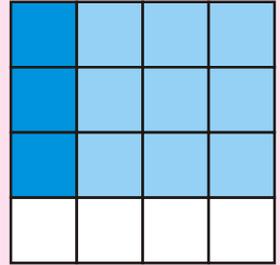
Example 1	Steps Followed	Example 2
$5 \times \frac{3}{4}$		$7 \times \frac{3}{14}$
$= \frac{5 \times 3}{4}$	▪ **Multiply the numerator with the whole number.**	$= \frac{21}{14}$
$= \frac{15}{4}$	▪ **Reduce it, if possible.**	$= \frac{\cancel{21}^{3}}{\cancel{14}_{2}}$
$= 3\frac{3}{4}$	▪ **Convert into mixed number (if improper).**	$= \frac{3}{2}$
	Write your answer in simplest form.	$= 1\frac{1}{2}$

Multiply two or more fractions (proper, improper and mixed fractions)

This figure represents $\frac{3}{4}$.

In order to find $\frac{1}{4}$ of $\frac{3}{4}$,

we will further divide $\frac{3}{4}$ into four equal parts and shade one out of four parts.

The figure below represents $\frac{1}{4}$ of $\frac{3}{4}$

which is $\frac{3}{16}$ (the double shaded region).

This was the pictorial representation of $\frac{1}{4}$ of $\frac{3}{4}$

Mathematically, $\frac{1}{4}$ of $\frac{3}{4} = \frac{1}{4} \times \frac{3}{4}$

$= \frac{1 \times 3}{4 \times 4}$ → Multiply the numerator and denominator

$= \frac{3}{16}$ → Write the product in lowest term

Example : **Solve:** $\frac{2}{9} \times \frac{3}{5} \times \frac{1}{2}$

Solution: $\frac{2}{9} \times \frac{3}{5} \times \frac{1}{2}$

$= \frac{2 \times 3 \times 1}{9 \times 5 \times 2}$ → Multiply the numbers at numerators and denominators

$= \frac{6}{90} \div \frac{3}{3}$

$= \frac{6 \div 3}{90 \div 3} = \frac{\cancel{2}^{1}}{\cancel{30}_{15}} = \frac{1}{15}$

Teacher's Note

Teacher should develop the concept of multiplication of fractions with the help of geometrical figures.

Multiplying mixed fraction:

Multiplying mixed fraction just requires one extra step i.e.
Must Convert Mixed fraction into Improper Fractions First,
Rest of the steps are same as multiplying two or more fractions.

Example 1	Steps Followed	Example 2
$1\frac{7}{3} \times 3\frac{1}{9}$		$4\frac{2}{5} \times 3\frac{7}{11}$
$= \frac{10}{3} \times \frac{28}{9}$	Convert mixed fractions into improper fractions and reduce (if possible)	$= \frac{22}{5} \times \frac{40}{11}$
$= \frac{10 \times 28}{3 \times 9}$	Multiply the numerators and denominators	$= \frac{22 \times 40}{5 \times 11}$
$= \frac{280}{27}$		$= \frac{\cancel{880}^{176}}{\cancel{55}_{11}}$
$= 10\frac{10}{27}$	Convert the product into mixed fraction (if improper)	$= \frac{\cancel{176}^{16}}{\cancel{11}_{1}}$
	Leave your answer in simplest form	$= 16$

Verify the commutative property of multiplication of fractions

According to this property, when we multiply **two** fractions, the change in order will not affect the result. It'll remain the same.

Example: **Verify:** $\frac{4}{7} \times \frac{9}{3} = \frac{9}{3} \times \frac{4}{7}$

Verification:

$\frac{4}{7} \times \frac{9}{3}$ = $\frac{9}{3} \times \frac{4}{7}$

$= \frac{4 \times 9}{21}$ $\quad$ $= \frac{9 \times 4}{21}$

$= \frac{36}{21}$ $\quad$ Result is same $\quad$ $= \frac{36}{21}$

So, $\frac{4}{7} \times \frac{9}{3} = \frac{9}{3} \times \frac{4}{7}$

Verify the associative property of multiplication of fractions

According to this property, when we multiply **three** fractions, the change in order will not affect the result. It'll remain the same.

Example: Verify: $\frac{2}{3} \times \left(\frac{5}{2} \times \frac{1}{4}\right) = \left(\frac{2}{3} \times \frac{5}{2}\right) \times \frac{1}{4}$

Verification:

So, $\frac{2}{3} \times \left(\frac{5}{2} \times \frac{1}{4}\right) = \left(\frac{2}{3} \times \frac{5}{2}\right) \times \frac{1}{4}$

EXERCISE 3.4

1. Simplify the following fractions.

(i) $\frac{5}{6}$ of 9 (ii) $\frac{4}{8}$ of 6 (iii) $\frac{3}{14}$ of 45

2. Find the product of the following fractions.

(i) $\frac{1}{2} \times \frac{4}{10}$ (ii) $\frac{6}{9} \times \frac{8}{6}$ (iii) $\frac{15}{21} \times \frac{6}{9} \times \frac{1}{2}$

(iv) $\frac{12}{24} \times \frac{15}{18}$ (v) $\frac{6}{12} \times \frac{21}{24}$ (vi) $\frac{8}{16} \times \frac{4}{8} \times \frac{3}{2}$

(vii) $4\frac{4}{5} \times 4\frac{3}{3}$ (viii) $8\frac{1}{4} \times 3\frac{2}{6}$ (ix) $8\frac{4}{5} \times 3\frac{6}{8}$

Teacher's Note Teacher should use some other examples for explanation of associative property of multiplication of fractions.

3. Applying commutative and associative property of multiplication to fill in the blank spaces.

(i) $\frac{1}{5} \times \frac{7}{4} = \cdots\cdots \times \frac{1}{5}$

(ii) $\frac{2}{9} \times \cdots\cdots = \frac{3}{7} \times \cdots\cdots$

(iii) $\cdots\cdots \times \frac{4}{7} = \cdots\cdots \times \frac{3}{7}$

(iv) $\frac{1}{2} \times \left(\frac{1}{5} \times \frac{1}{4}\right) = \left(\frac{1}{2} \times \cdots\cdots\right) \times \frac{1}{4}$

(v) $\frac{3}{10} \times \left(\cdots\cdots \times \frac{6}{5}\right) = \left(\cdots\cdots \times \frac{2}{7}\right) \times \frac{6}{5}$

3.5 DIVISION OF FRACTIONS

Divide a fraction by a whole number

In order to understand the division of fractions by a whole number, consider the following example.

Example 1: Solve $\frac{1}{2}$ **4**

Solution: $\frac{1}{2}$ 4 means one half is divided into 4 more parts.

Thus each part will be called $\frac{1}{4}$ of $\frac{1}{2}$.

So, $\frac{1}{4} \times \frac{1}{2}$ *or* $\frac{1}{2} \times \frac{1}{4}$

$= \frac{1 \times 1}{2 \times 4}$

$= \frac{1}{8}$

Division by 4 is the same as multiplication by $\frac{1}{4}$ (reciprocal or multiplicative inverse of 4))

Finding Reciprocal of simple fraction means interchanging the numerator and denominator

Teacher's Note Teacher should solve some more examples in the class room to strengthen the concept of division of whole number by fraction.

Example 2: **Solve:**

Solution:

$$\frac{3}{7} \div 5 = \frac{3}{7} \div \frac{5}{1} \quad \left(5 \text{ is the same as } \frac{5}{1} \right)$$

$$= \frac{3}{7} \times \frac{1}{5} \longrightarrow$$

- Change division into multiplication
- At the same time reciprocate 5

$$= \frac{3 \times 1}{7 \times 5} = \frac{3}{35}$$

Divide a whole number by a fraction

Example: **Solve:** $15 \quad \frac{2}{3}$

Solution: $15 \quad \frac{2}{3} = 15 \times \frac{3}{2} \longrightarrow$

Always the number after the division sign is reciprocated

$$= \frac{15 \times 3}{2}$$

$$= \frac{45}{2} = 22\frac{1}{2}$$

Divide a fraction by another fraction (proper, improper and mixed fractions)

The method remains the same.

Example 1: **Solve:** $\frac{7}{9} \quad \frac{14}{27}$

Solution: $\frac{7}{9} \quad \frac{14}{27}$

$$= \frac{\cancel{7}^{1}}{\cancel{9}_{1}} \times \frac{\cancel{27}^{3}}{\cancel{14}_{2}}$$

$$= \frac{1 \times 3}{1 \times 2}$$

$$= \frac{3}{2} = 1\frac{1}{2}$$

Explanation

- Convert ‘ ’ sign into ‘x’ sign
- Reciprocates the second fraction
- Multiply the numerators and denominators
- Reduce if possible
- Keep your answer in the simplest form

Example 2: **Solve** $2\frac{2}{7} \quad 1\frac{3}{5}$

Solution: $2\frac{2}{7} \quad 1\frac{3}{5} = \frac{16}{7} \quad \frac{8}{5}$

$= \frac{16}{7} \times \frac{5}{8}$

$= \frac{\overset{2}{\cancel{16}}}{7} \times \frac{5}{\underset{1}{\cancel{8}}}$

$= \frac{10}{7} = 1\frac{3}{7}$

EXERCISE 3.5

Solve the following.

(i)	$\frac{4}{9}$	$\frac{16}{9}$	(ii)	$\frac{4}{8}$	$\frac{2}{12}$	(iii)	$\frac{15}{20}$	$\frac{3}{12}$
(iv)	$\frac{1}{4}$	$\frac{7}{16}$	(v)	$\frac{9}{10}$	$\frac{12}{15}$	(vi)	$\frac{9}{30}$	$\frac{6}{12}$
(vii)	$\frac{12}{21}$	$\frac{6}{27}$	(viii)	$\frac{5}{25}$	$\frac{20}{30}$	(ix)	$2\frac{1}{3}$	$\frac{2}{5}$
(x)	$2\frac{1}{3}$	$\frac{2}{4}$	(xi)	$2\frac{4}{5}$	$\frac{2}{3}$	(xii)	$3\frac{6}{83}$	$4\frac{2}{4}$
(xiii)	6	$\frac{2}{3}$	(xiv)	$\frac{2}{3}$	8	(xv)	$\frac{12}{5}$	9

Solve real life problems involving fractions using all four operations

Example 1: One jar contains $\frac{1}{2}$ Kg of sugar. Another jar contains $\frac{1}{4}$ Kg of sugar. What is the total quantity of the sugar.

Solution: $\frac{1}{2} + \frac{1}{4} = \frac{2+1}{4} = \frac{3}{4}$

Thus, the total quantity of the sugar is $\frac{3}{4}$ Kg.

Teacher's Note

Teacher should teach the students how to change real life problems in mathematical form and solve them.

Example 2: Nasima purchased $4\frac{1}{4}$ Kg of milk powder. She used $1\frac{3}{8}$ Kg of it in a month. How much milk powder is left?

Solution: Quantity of milk powder = $4\frac{1}{4}$ Kg.

Quantity of milk powder used = $1\frac{3}{8}$ Kg.

Quantity of milk powder left = $4\frac{1}{4} - 1\frac{3}{8}$

Now $4\frac{1}{4} - 1\frac{3}{8} = \frac{17}{4} - \frac{11}{8}$

$= \frac{34 - 11}{8} = \frac{23}{8} = 2\frac{7}{8}$

Hence, the milk powder is left = $2\frac{7}{8}$ Kg.

Example 3: What will be the total length of 5 pieces of string, if each piece is $\frac{3}{4}$ metre long.

Solution: Length of 1 piece = $\frac{3}{4}$ m

Length of 5 pieces = $\frac{3}{4} \times 5 = \frac{15}{4} = 3\frac{3}{4}$ m

Thus the total length of 5 pieces of string is $3\frac{3}{4}$ m

EXERCISE 3.6

1. A family used $4\frac{1}{4}$ litres of milk and another family used $7\frac{1}{2}$ litres of milk in a day. How much quantity of milk was used by both families in the day?

2. My aunty buys a piece of ribbon that was $4\frac{1}{6}$ cm long. She buys another piece of ribbon that was $4\frac{2}{5}$ cm long. How much longer the second piece of ribbon was?

3. I am $8\frac{1}{2}$ years old and my brother is $2\frac{1}{2}$ years younger than me, what is the age of my brother?

4. Nazia has $4\frac{4}{5}$ metres of ribbon. She used $\frac{1}{2}$ of this ribbon to tie a present for her daughter. How many metres of ribbon did she use?

5. A tree is 18 metre tall. How many pieces of wood can be cut from the tree, if each piece is to be $\frac{2}{3}$ metre long?

6. Shopkeeper has 15 kg of peanuts. He places $\frac{2}{5}$ kgs of peanuts in a bag. How many bags will he use?

REVIEW EXERCISE

1. Convert the following into mixed fractions:

(i) $\frac{66}{8}$ (ii) $\frac{17}{3}$ (iii) $\frac{23}{5}$ (iv) $\frac{40}{5}$

2. Convert the following mixed fractions into improper fraction:

(i) $8\frac{4}{5}$ (ii) $3\frac{5}{8}$ (iii) $7\frac{3}{7}$ (iv) $4\frac{3}{2}$

3. Write down the following fractions in ascending order:

(i) $\frac{3}{8}, \frac{9}{8}, \frac{5}{8}$ (ii) $\frac{2}{3}, \frac{1}{4}, \frac{5}{6}$

(iii) $\frac{6}{4}, \frac{8}{3}, \frac{7}{6}, \frac{5}{2}$ (iv) $\frac{2}{7}, \frac{5}{11}, \frac{4}{5}, \frac{3}{11}$

4. Write down the following fraction in descending order:

(i) $\frac{13}{6}, \frac{11}{6}, \frac{7}{6}$ (ii) $\frac{2}{3}, \frac{3}{5}, \frac{5}{6}$

(iii) $\frac{4}{15}, \frac{3}{10}, \frac{9}{20}, \frac{4}{5}$ (iv) $\frac{4}{3}, \frac{3}{5}, \frac{5}{7}, \frac{1}{3}$

5. Reduce the following fractions into lowest terms:

(i) $\frac{30}{42}$ (ii) $\frac{24}{44}$ (iii) $2\frac{4}{8}$ (iv) $3\frac{3}{6}$

6. Simplify:

(i) $\frac{3}{5} + \frac{2}{4}$ (ii) $\frac{7}{9} + \frac{4}{6} + \frac{2}{3}$

(iii) $\frac{4}{5} + \frac{6}{10} + \frac{1}{2}$ (iv) $\frac{2}{3} + 4\frac{1}{2}$

7. Simplify:

(i) $\frac{3}{4} - \frac{4}{8}$ (ii) $\frac{11}{5} - \frac{9}{5}$

(iii) $5\frac{2}{3} - 4\frac{2}{4}$ (iv) $\frac{13}{15} - \frac{5}{10} - \frac{1}{5}$

8. Multiply the following fractions and give your answer in lowest terms:

(i) $2\frac{2}{5} \times 2\frac{1}{2}$ (ii) $1\frac{2}{3} \times 2\frac{1}{4}$

(iii) $\frac{28}{35} \times \frac{12}{21}$ (iv) $1\frac{3}{5} \times 1\frac{5}{10}$

9. Divide the following fractions and give your answer in lowest terms:

(i) $\frac{5}{6}$ 25 (ii) $\frac{3}{4}$ $\frac{5}{8}$

(iii) $5\frac{1}{2}$ $1\frac{1}{4}$ (iv) $7\frac{3}{5}$ $1\frac{7}{12}$

10. Nasir and his friend were jogging on a track. Nasir jogged $7\frac{1}{2}$ km and his friend jogged $4\frac{2}{3}$ km. How much more distance did Nasir cover than his friend?

11. There are 32 balloons in a room, out of which $\frac{1}{4}$ are red. How many balloons in the room are red?

12. Javeria's doll dress requires $\frac{3}{4}$ metre of fabric. How many dresses of doll can be made from $3\frac{3}{4}$ metres of fabric?

13. A factory makes $9\frac{1}{2}$ litres of apple juice each hour. How many litres of apple juice will the factory make in 14 hours?

DECIMALS AND FRACTIONS

4.1 DECIMALS

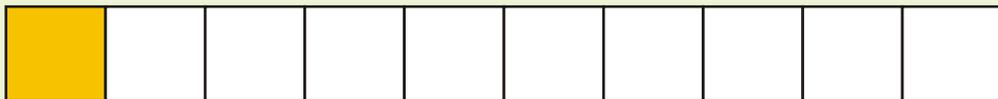
Know a decimal number as an alternate way of writing a fraction

In previous unit, we have learnt about common fractions.

There is another way of writing common fractions called Decimals. Let's learn about what are decimals.

Define a decimal as a fraction whose denominator is 10 or a power of 10

A decimal number is a special type of a fraction whose denominator is 10 or a power of 10 which means 10, 100, 1000 etc.

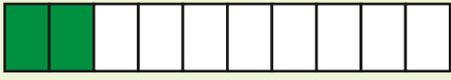
Look at the figure given below.

It represents a whole divided into 10 equal parts of which one is coloured.

In **common fraction form** the shaded portion is written as $\frac{1}{10}$ and read as one tenth.

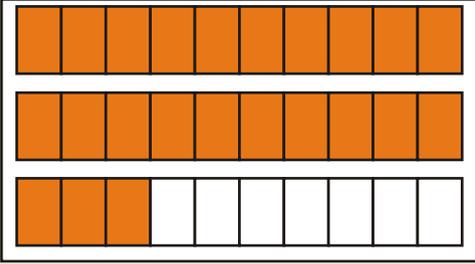
In **decimal form** the shaded portion is written as 0.1 and read as one-tenth or 'zero point one'.

Here dot (.) is known as the decimal point.

It separates the whole number part and the fractional part.

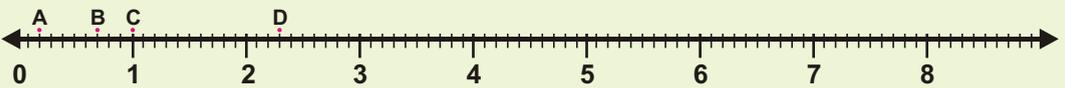
In the same way coloured portion of:

 represents $\frac{2}{10}$ or 0.2

represents $\frac{7}{10}$ or 0.7

represents $\frac{10}{10}$ = 1.0 or (1 whole)

represents $2\frac{3}{10}$ or 2.3

(2 whole and 3 tenths)

All this can also be represented on a number line shown below.

A B C D
0 1 2 3 4 5 6 7 8

Point A represents $\frac{2}{10}$ or 0.2, point B represents $\frac{7}{10}$ or 0.7, point C represents $\frac{10}{10}$ or 1.0 and point D represents $2\frac{3}{10}$ or 2.3.

Each of the following figure is divided into 100 equal parts. The coloured portion of these figures represents:

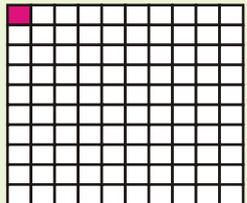



Figure 1

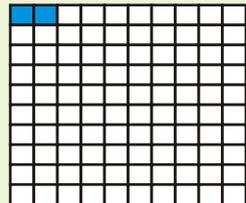



Figure 2

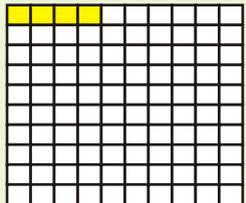



Figure 3

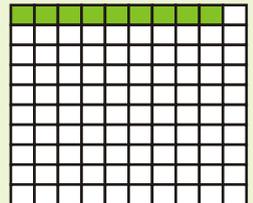



Figure 4

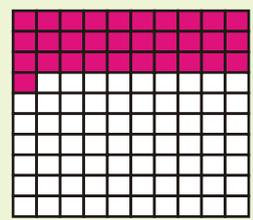
Figure 1: One-hundredth = $\frac{1}{100}$ = 0.01 (Read as zero point zero one.)

Figure 2: Two-hundredth = $\frac{2}{100}$ = 0.02 (Read as zero point zero two.)

Figure 3: Four-hundredth = $\frac{4}{100}$ = 0.04 (Read as zero point zero four.)

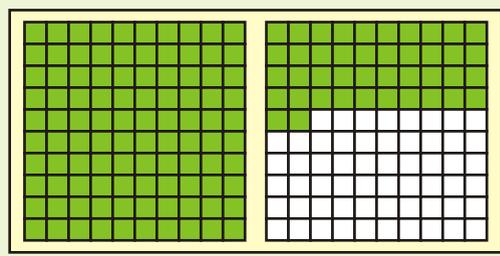
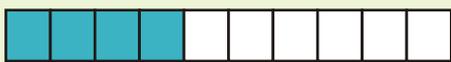
Figure 4: Nine-hundredth = $\frac{9}{100}$ = 0.09 (Read as zero point zero nine.)

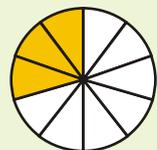
Example 1: If the whole is divided into 100 equal parts, and 31 of them are shaded. Write in decimal fraction.

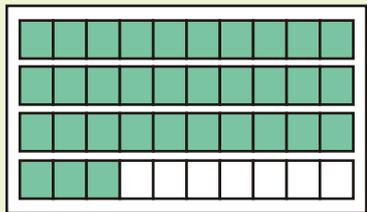
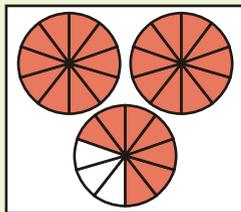
In fraction form it is written as $\frac{31}{100}$ and read as thirty one hundredths. Where as, in decimal form it is written as 0.31

Note that there are 2-digits after the decimal point, if the whole is divided into 100 equal parts.

0.31
and read as
"zero point
three one"

Similarly, in the given figure coloured portion $1\frac{42}{100}$ represents or 1.42

Read as one point four two.

Write the common fractions as well as the decimal fractions represented by the coloured portions of the figures:

Common fraction = $\frac{4}{10}$

Decimal fraction = 0.4

Common fraction =

Decimal fraction =

Common fraction = ____

Decimal fraction = _____

Common fraction = ______

Decimal fraction = ________

Recognize the places occupied by the digits, after the decimal point, as decimal places

The number of digits after the decimal point are called the **Decimal Places**.

Look at the following examples.

(1) 3.2 represents decimal fraction up to **one decimal place** as it has only one digit after the decimal point.

Fractional part has a denominator of 10.

(2) 1.43 represents decimal fraction up to **two decimal places** as it has two digits after the decimal point.

Fractional part has a denominator of 100.

(3) 1.324 represent decimal fraction up to **three decimal places** as it has three digits after the decimal point.

Fractional part has a denominator of 1000.

Fill the given table with the denominator and the decimal places for the decimal numbers given below:

Decimals	Denominator	No. of decimal places
0.3	10	One
13.5		
0.84		
732.52		
0.324		
583.123		

The number of decimal places will always be equal to the number of zeroes in the denominator.

Identify the place value of a digit in decimals

In decimal fraction, the value of the digit after the decimal point decreases by 10 times.

Look at the following table to understand the place values in decimal fraction.

Fractions	H T O	.	t tenth	h hundredth	th thousandth
$\frac{1}{10}$	0	.	1		
$\frac{1}{100}$	0	.	0	1	
$\frac{1}{1000}$	0	.	0	0	1

- The first digit after the decimal point has a place value of 'one-tenths' or '0.1' and it is the first decimal place.
- The second digit after the decimal point has a place value equal to 'one- hundredths' or '0.01' and it is the second decimal place.
- The third digit after the decimal point has a place value equal to 'one-thousandths' or '0.001' and it is the third decimal place.

Example 1: Write the place values of encircled digits in the following numbers:

(1) 53.(5)79 — 5 tenths or $\frac{5}{10}$ or 0.5

(2) 1.0(3)2 — 3 hundredths or $\frac{3}{100}$ or 0.03

(3) 2.1(1)37 — 1 hundredths or $\frac{1}{100}$ or 0.01

(4) 123.87(3) — 3 thousandths or $\frac{3}{1000}$ or 0.003

Example 2: Identify the place value of each digit in **23.416**

Let's first write the given number under the place value chart.

Place value of 2 = 2 tens = 2 x 10 = 20

Place value of 3 = 3 ones = 3 x 1 = 3

Place value of 4 = 4 tenths = $\frac{4}{10}$ = 0.4

Place value of 1 = 1 hundredths = $\frac{1}{100}$ = 0.01

Place value of 6 = 6 thousandths = $\frac{6}{1000}$ = 0.006

EXERCISE 4.1

1. Draw the figures for the following decimal fractions.

(i)	**0.3**	(ii)	**0.8**	(iii)	**1.3**
(iv)	**1.7**	(v)	**0.34**	(vi)	**1.5**

2. Write down the number of decimal places in each.

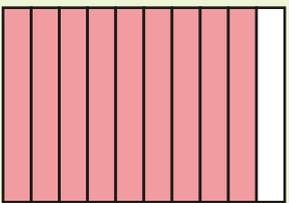
(i)	**123.1**	(ii)	**57.322**	(iii)	**0.87**
(iv)	**139.45**	(v)	**59.552**	(vi)	**735.9**

3. Write down the place value of encircled digit.

(i)	**725.0(4)**	(ii)	**135.(8)5**	(iii)	**5.09(2)**
(iv)	**(1)24.3(2)**	(v)	**(4)3.5(9)**	(vi)	**(3)4.6(7)**

4. Write down the place value of each digit.

(i)	575.1	(ii)	0.534	(iii)	18.97
(iv)	9.02	(v)	75.84	(vi)	51.15

5. Match the coloured part of figures with the correct decimal fractions.

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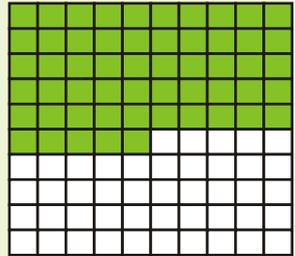
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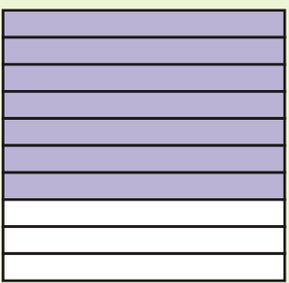
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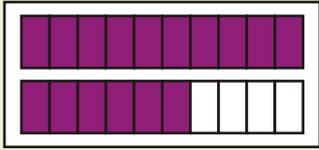
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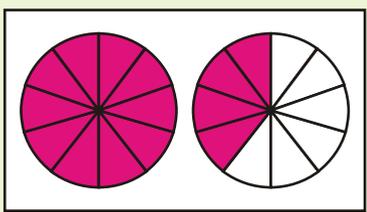
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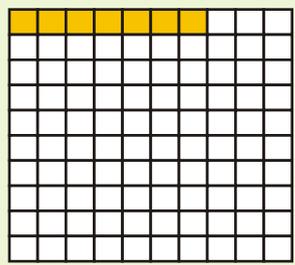
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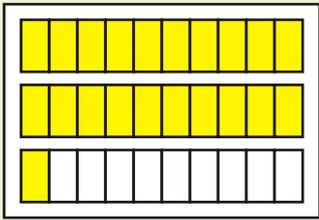
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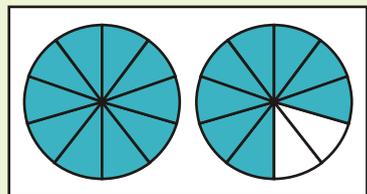
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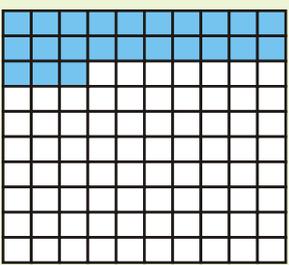
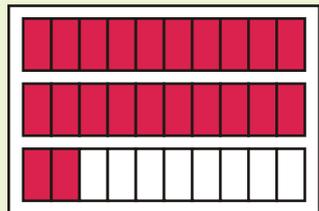

1.6

0.7

4.2 CONVERSION BETWEEN FRACTIONS AND DECIMALS

Convert a given fraction to a decimal if,
(i) denominator of the fraction is 10 or a power of 10.

In order to understand how to convert the fraction into decimal when the denominator is 10, 100 or 1000.
Consider the following examples.

Example 1: **Convert $\frac{3}{10}$ into decimal.**

Solution: $\frac{3}{10}$ = 3 tenths.

So, $\frac{3}{10} = 0.3$

Example 2: **Convert $\frac{3}{100}$ into decimal.**

Solution: Here, $\frac{3}{100}$ = 3 hundredths.

So, $\frac{3}{100} = 0.03$ ← because there are no tenths.

But, if we have to convert $\frac{13}{100}$ into decimal, it will be 0.13

Example 3: **Convert $\frac{23}{10}$ into decimal.**

Solution: Since, it is an improper fraction, it is easier to first convert it into mixed fraction.

$\frac{23}{10} = 2\frac{3}{10}$

Now $2\frac{3}{10}$ means 2 wholes and 3 tenths, i.e 2.3

So, $\frac{23}{10} = 2.3$ → fractional part

↓ whole number part

So, in 2.3, 2 is whole number and .3 or $\frac{3}{10}$ is fraction.

Example 4: **Convert $\frac{32}{1000}$ into decimal.**

Solution: $\frac{32}{1000}$ means 32 thousandths.

So, $\frac{32}{1000} = 0.032$

(ii) Conversion of fractions into decimals when the denominator is not 10, 100 or 1000

Example 1: **Convert $\frac{1}{2}$ into decimal.**

Solution: Here, the denominator is not 10 or a power of 10 but it can be converted into 10 or powers of 10.

Now $\frac{1}{2} = \frac{1}{2} \times \frac{5}{5}$

- **Making denominator multiple of 10 or power of 10**

$= \frac{5}{10}$ is equivalent to $\frac{1}{2}$

= 5 tenths = 0.5, this means $\frac{1}{2} = 0.5$

Example 2: **Convert $\frac{13}{4}$ into decimal.**

Solution: $\frac{13}{4} = 3\frac{1}{4}$ [mixed number]

$= 3 + \frac{1}{4}$ [3 wholes and one fourth]

$= 3 + \frac{1}{4} \times \frac{25}{25}$

- **$\frac{1}{4}$ can be converted into its equivalent fraction with denominator 100**

$= 3 + \frac{25}{100}$

$= 3 + \frac{25}{100}$

- **3 wholes and 25 hundredths**

$= 3.25$

Example 3: **Convert $\frac{11}{25}$ into decimal.**

Solution: ▪ **Making denominator multiplying by 10**

$$\frac{11}{25} = \frac{11}{25} \times \frac{4}{4}$$

$$= \frac{44}{100} = 0.44$$

Convert decimals (up to three decimal places) to fractions

You need to be good at place values of decimals to convert decimals to fractions. Let's consider the following examples.

Example 1: **Convert 0.4 into common fraction.**

Solution: 0.4 = 4 tenths

▪ **Replace (.) by 1, add 0 for each digit on the right.**

$= \frac{4}{10}$ ▪ **1st decimal place is tenths; so, denominator will be 10**

$$= \frac{\cancel{4}^{2}}{\cancel{10}_{5}} = \frac{2}{5}$$

Example 2: **Convert 0.32 into fraction.**

Solution: 0.32 = 32 hundredths

▪ **Making denominator multiplying by 100**

$= \frac{32}{100}$ ▪ **2nd decimal place means denominator is 100**

$= \frac{{}^{16}\cancel{32}}{\cancel{100}_{50}}$ ▪ **Simplifying dividing by 4**

$$= \frac{{}^{8}\cancel{16}}{\cancel{50}_{25}}$$

$$= \frac{8}{25}$$

Example 3: **Convert 1.24 into fraction.**

Solution: 1.24 = 1 whole and 24 hundredths

$$1.24 = 1\frac{24}{100}$$

$$= 1\frac{\overset{6}{\cancel{24}}}{\underset{25}{\cancel{100}}} = 1\frac{6}{25}$$ ▪ **Dividing by 4**

Example 4: **Convert 0.135 into fraction.**

Solution: 0.135 = 135 thousandths

$$0.135 = \frac{135}{1000}$$

$$= \frac{\overset{27}{\cancel{135}}}{\underset{200}{\cancel{1000}}} = \frac{27}{200}$$ ▪ **Dividing by 5**

EXERCISE 4.2

1. Convert the following fractions into decimals.

(i) $\frac{1}{100}$ (ii) $\frac{5}{10}$ (iii) $\frac{23}{100}$ (iv) $\frac{431}{1000}$

(v) $\frac{231}{100}$ (vi) $\frac{17}{10}$ (vii) $\frac{29}{1000}$ (viii) $\frac{11}{100}$

2. Convert the following fractions into decimals.

(i) $\frac{7}{25}$ (ii) $\frac{42}{4}$ (iii) $\frac{9}{2}$ (iv) $\frac{3}{4}$

(v) $\frac{13}{50}$ (vi) $\frac{3}{8}$ (vii) $\frac{19}{25}$ (viii) $\frac{30}{50}$

3. Convert the following decimals into common fractions and give your answer in simplest form.

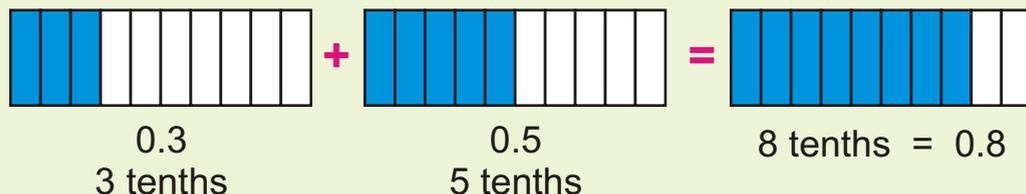
(i) 0.3 (ii) 1.35 (iii) 12.37 (iv) 0.432

(v) 25.5 (vi) 2.32 (vii) 0.45 (viii) 135.2

4.3 BASIC OPERATION ON DECIMALS

Add and subtract decimals (up to three decimal places)

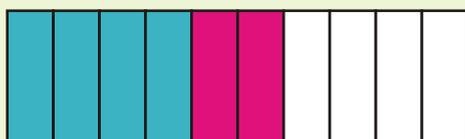
Look at the following pictorial example to understand addition of decimals

Example 1:

We can write it as:

$$\begin{array}{r} 0\,.\,3 \\ +\ 0\,.\,5 \\ \hline 0\,.\,8 \\ \hline \end{array}$$

- Align the decimal point, i.e put decimal point just one below the other.
- Start from the digit at the lowest place value.
- Do the usual addition.
- Decimal point in the answer also should be aligned.

Example 2: **Subtract.**

0.6 – 0.2 = 0.4
6 tenths – 2 tenths = 4 tenths

$$\begin{array}{r} 0\,.\,6 \\ -\ 0\,.\,2 \\ \hline 0\,.\,4 \\ \hline \end{array}$$

Example 3: **Subtract the following.**

(i) 3.57 — 2.43

(ii) 7.84 — 1.75

EXERCISE 4.3

1. Add the following decimals.

(i) 0.35 + 0.42
(ii) 0.21 + 0.35 + 0.11
(iii) 1.27 + 3.49
(iv) 13.5 + 14.2 + 7.9
(v) 1.34 + 0.43
(vi) 25.32 + 15.75
(vii) 0.3 + 0.9 + 0.4
(viii) 1.5 + 3.9 + 17.2
(ix) 68.378 + 12.633
(x) 42.243 + 81.483

2. Subtract the following decimals.

(i) 0.9 – 0.3
(ii) 0.84 – 0.61
(iii) 10.59 – 3.27
(iv) 13.54 – 12.87
(v) 15.39 – 12.41
(vi) 87.34 – 85.56
(vii) 19.31 – 10.32
(viii) 54.79 – 39.84
(ix) 49.243 – 17.157
(x) 76.919 – 64.883

Multiply decimal by 10, 100 and 1000

Multiplication of decimals by 10,100 or 1000 just invites moving the decimal point to the right depending upon the power of 10 we are multiplying with.

Example 1: Multiply 3.24 x 10

Solution: 3.2 4 x 10

= 32.4

```
   3.24
 x   10
-------
  0000
 324x
-------
  32.40
-------
```

(We have multiply numbers where decimal fraction is of two place value. Count digits from right to left. Put decimal after two numbers)

Here the decimal point moves one place to the right.

Example 2:

Multiply 0.325 by 100

0.32 5 x 100

= 32.5

The number has increased because of increase in place value.

Decimal point moves two places to the right.

Example 3:

Multiply 1.834 x 1000

1.834 x 1000

= 1834.0

Or 1834

Decimal point in the end has no value, no fractional part.

Decimal point moves three places to the right.

Multiply a decimal by a 2-digit number

Look at the following examples.

Example 1: Multiply 13.5 x 15

Solution:

```
 ¹1 3.5
   x 1 5
 --------
   6 7 5   →
 1 3 5 0   →
 --------
 2 0 2.5   →
 --------
```

- Do the multiplication just as in the case of whole numbers, ignoring the decimal point for a while.
- Multiply the units or ones
- Multiply the tens
- Now look at the total number of decimal places in the numbers being multiplied. There is only one decimal place so, the product should also have one decimal place. Put decimal at one decimal place from right.
- One decimal place In the product

Hence, **13.5 x 15 = 202.5**

EXERCISE 4.4

1. Do the following multiplications.

(i)	6.3 x 3	(ii)	0.25 x 10	(iii)	1.732 x 100
(iv)	0.327 x 100	(v)	22.3542 x 100	(vi)	1.265 x 1000
(vii)	1.872 x 1000	(viii)	0.8546 x 1000	(ix)	0.85 x 25
(x)	7.9 x 13	(xi)	7.21 x 33	(xii)	1.834 x 11
(xii)	5.42 x 24	(xiv)	0.49 x 71	(xv)	3.52 x 45

Divide a decimal by a 1-digit number (quotient being a decimal up to two decimal places)

To divide a decimal number by a one digit number (whole number), follow the usual method of dividing whole numbers, just remember to place the decimal point in the quotient when it comes in the dividend.

Look at the following examples to understand this concept.

Example : Divide **27.5** by **5**

Solution:

```
                            5 . 5
                         ________
                       5) 2 7 . 5
[ 5 x 5 = 25 ]           - 2 5
                         ------
                            2 5
[ 5 x 5 = 25 again ]      - 2 5
                         ------
                            0 0
```

Steps:

- Start from whole numbers we have 27. Divide 27 by 5.
- Because 5 x 5 = 25
- Now 2 is smaller than the divisor 5, so bring next 5 down, but before that there is a decimal point so shift it to the quotient.

Hence, **27.5 5 = 5.5**

Teacher's Note Teacher should teach the students to divide and decimal by 1-digit numbers and give them more examples to solve for sufficient practice.

EXERCISE 4.5

Divide the following.

(i) 17.1 6	(ii) 1.8 5	(iii) 9.36 4
(iv) 9.66 3	(v) 4.68 9	(vi) 17.85 7
(vii) 6.28 4	(viii) 0.72 2	(ix) 5.62 2
(x) 34.23 3	(xi) 67.25 5	(xii) 32.34 6
(xii) 96.20 2	(xiv) 10.11 3	(xv) 40.05 5

Solve real life problems involving decimals up to two decimal places.

Example 1: Sana bought **0.25 kg** of cadbury chocolates, **10.50 kg** of flour and **2.50 kg** of sugar. What is the total mass of ingredients she bought

Solution:

Cadburry chocolate	[1] 0 . 2 5 Kg
Flour	1 0 . 5 0 Kg
Sugar	+ 2 . 5 0 Kg
	1 3 . 2 5 Kg

She bought a total mass of **13.25 kg**.

Example 2: Ali's height is **1.75 m** and Azhar's height is **1.27 m**. How tall is Ali than Azhar?

Solution: To find out the difference between their heights. So do subtraction.

Ali's height	1 . ~~7~~[6] [1]5
Azhar's height	−1 . 2 7
Difference	0 . 4 8

Hence Ali is **0.48 m** taller than Azhar.

Example 3:

The cost of one kilogram of flour is **Rs 32.50**, what will be the total cost of **15 kg** of flour?

Solution:

One kg of flour cost = **Rs 32.50**,

the cost of **15 kg** will be = **32.50 x 15**

So,
```
  3 2 . 5 0
 x      1 5
 ----------
  1 6 2 5 0
+ 3 2 5 x x
 ----------
  4 8 7. 5 0
```

The total cost of 15 kg of flour will be **Rs 487.50**

Example 4:

Mrs. Aslam wants to divide **3.36kg** of sweets equally among **4** relatives. How much will each relative get?

Solution:

```
     0 . 8 4
   ---------
 4 ) 3 . 3 6
   - 3 2
   -------
       1 6
     - 1 6
   -------
       0 0
```

[before taking 33, shift the decimal point to the quotient]

3.36 4 = 0.84

Hence, each of the relative will get **0.84** kg of sweets.

EXERCISE 4.6

1. Ahmed purchased a shirt for **Rs 325.80** and a jeans for **Rs 525.25.** Find the amount spent.
2. Javeria's weight is **10.24 kg** and her sister's weight is **11.28 kg**. What is the total weight of both the sisters?
3. Ansa paid a total cost of **Rs 97.5** to the shopkeeper for a pencil case and a colour box. If the pencil case costs **Rs 30.25**, find the cost of the colour box.
4. Haroon and Shafique spent **Rs 95.823**. Haroon spent **Rs 89.75**. What amount was spent by Shafique?
5. Ali has **Rs 50.29** as pocket money. He gave **Rs 15.45** to his sister Nida and spent **Rs 13.84** on coffee. How much money has left with him?
6. Aslam brought **65** hens for his farm. The weight of each hen is **2.72 kg**. What is the weight all have?
7. One set of books weigh **3.75 kg.** What will be the weight of **32** such sets?
8. Yusra cuts a ribbon **13.75 m** long into **5** equal pieces. Find the length of each piece.
9. The total weight of **5** sacks of flour is **58.75 kg**. Find the weight of one sack of flour.

REVIEW EXERCISE

1. Write down the place values of circled digits in the following.

(i) 2.32⑤ (ii) ①7.⑨53 (iii) 37.8⑦

2. Convert the following fractions to decimals.

(i) $\frac{321}{100}$ (ii) $\frac{175}{1000}$ (iii) $\frac{19}{4}$ (iv) $\frac{27}{8}$

3. Convert the following decimals to fractions.

(i) 1.54 (ii) 0.35 (iii) 13.7 (iv) 0.345

4. Solve the following.

(i) 1.57 + 3.42 (ii) 0.37 – 0.18

(iii) 17.55 + 23.42 (iv) 1.94 – 0.89

5. Multiply the following.

(i) 0.325 x 100 (ii) 17.55 x 10

(iii) 3.5252 x 1000 (iv) 2.57 x 32

6. Divide the following.

(i) 9.42 6 (ii) 2.52 7 (iii) 8.61 3

7. Anas ran a distance of **110.25m** and Ayaan ran **97.75m**. What is the total distance that they both ran altogether? How much more distance did Anas ran than Ayaan?

8. Abdullah drink **0.45ℓ** of juice every day. How many litres of juice does he drink in **30** days?

5.1 LENGTH

We have learnt that the small lengths are measured in metres (m) and centimetres (cm) and long distances are measured in kilometres (km).

1. Conversion of units of length:

Convert kilometres to metres, metres to centimetres and centimetres to millimetres.

(i) Convert kilometres to metres.

There are 1000 metres in a kilometre.

1 kilometre (km) = 1000 metre (m)

So, we multiply the numbers of kilometres by 1000 to change them into meters.

Example 1: Convert 2 kilometres into metres

Solution: 2 km = 2 x 1000 = 2000 m

Example 2: Convert 8 kilometres into metres

Solution: 8 km = 8 x 1000 = 8000 m

Convert to meters.

1	6 km =	6 x 1000	= 6000 m
2	9 km =	______	= ____ m
3	12 km =	______	= ____ m
4	25 km =	______	= ____ m
5	50 km =	______	= ____ m
6	75 km =	______	= ____ m
7	80 km =	______	= ____ m

Teacher's Note Teacher should explain the students to convert the different units of length through multiplication by 1000, 100 and 10.

(ii) Convert metres to centimetres

There are 100 centimetres in a metre.

1 metre (m) = 100 centimetres (cm)

So, we multiply metres by 100 to change into centimetres.

Example 1: Convert 6 metres into centimetres

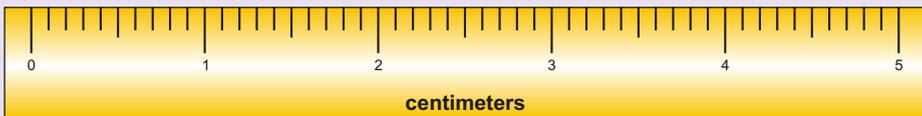
Solution: 6 x 100 = 600 cm

Example 2: Convert 20 metres into centimetres

Solution: 20 m = 20 x 100 = 2000 cm

Convert metres into centimetres.

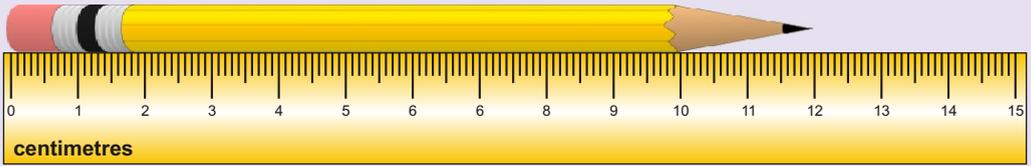
1	5 m =	5 x 100	= 500 cm
2	9 m =	______	= ______ cm
3	18 m =	______	= ______ cm
4	45 m =	______	= ______ cm
5	60 m =	______	= ______ cm
6	87 m =	______	= ______ cm

(iii) Convert centimetres to millimetres.

Each centimetre unit is divided into 10 smaller units.

Each smaller unit is called a **millimetre (mm).**

There are 10 mm in a cm.

1 centimetre (cm) = 10 millimetres (mm)

Example 1: Measure the length of this pencil in centimetres and convert it into millimetres.

Solution: The length of this pencil is 12 cm.

To find the length in millimetres, we multiply centimetres by 10.

So, **12 cm = 12 x 10 = 120 mm**

The length of pencil is 120 mm.

Example 2: Convert 85 cm to millimetres

Solution: 85 cm = 85 x 10 = 850 mm

Activity **Convert the following into millimetres.**

1	7 cm = 7 x 10	= 70	mm
2	10 cm = ______	= ______	mm
3	11 cm = ______	= ______	mm
4	31 cm = ______	= ______	mm
5	49 cm = ______	= ______	mm

Following is the table showing relationship among units of length.

Example 3: A boy purchased a rope 2 metre long. Convert it into centimetres and millimetres.

2 metre

Solution: 2 m = 2 x 100 cm = 200 cm

Again: 2 m = 2 x 1000 mm = 2000 mm

EXERCISE 5.1

1 Convert into metres.

2 Convert into centimetres.

3 Convert into millimetres?

4 Change into centimetres and millimetres?

2. Addition and Subtraction of units of length:

Add and subtract expressions involving similar units of length.

As metres are added to metres and kilometres are added to kilometres, so like units are to be added and subtracted from each other.

Example 1: Add **24 km 233 m** and **20 km 446 m**

Solution:

	km	m
	24	233
+	20	446
	44	679

Thus, sum is **44 km 679 m**

Example 2: Add **42 m 75 cm** and **28 m 90 cm**

Solution:

	m	cm
	① ①	
	42	75
+	28	90
	71	65

Thus, sum is **71 m 65 cm**

Example 3: Subtract **34 km 23 m** from **78 km 86 m**

Solution:

	km	m
	78	86
–	34	23
	44	63

Thus, difference is **44 km 63 m**

Example 4: Subtract **25 m 56 cm** from **47 m 23 cm**

Solution:

	m	cm
	6	1
	4~~7~~	~~2~~3
–	25	56
	21	67

Thus, difference is **21 m 67 cm**

EXERCISE 5.2

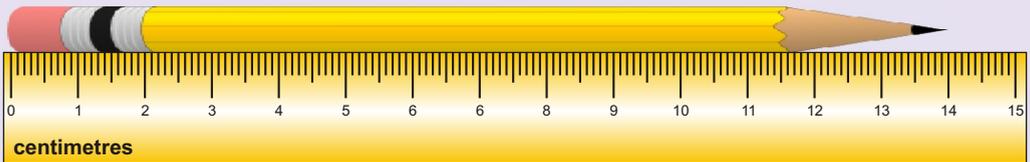
(1) Add:

(i) 4200 m and 9600 m
(ii) 25 km 520 m and 12 km 840 m
(iii) 49 km 719 m and 32 km 103 m
(iv) 30 km 60 m and 29 km 29 m
(v) 69 m 17 cm and 99 m 32 cm
(vi) 42 cm 3 mm and 68 cm 5 mm
(vii) 13 m 25 cm, 40 m and 65 m 5 cm
(viii) 90 km 820 m, 75 km 500 m and 110 km 175 m
(ix) 45 km 340 m , 82 km 399 m and 230 km 180 m

(2) Subtract:

(i) 5050 m from 7000 m
(ii) 2 m 76 cm from 6 m 35 cm
(iii) 34 m 20 cm from 36 m 80 cm
(iv) 305 m 20 cm from 862 m 60 cm
(v) 36 km 500 m from 87 km 250 m
(vi) 18 km 352 m from 70 km 100 m
(vii) 106 m 18 cm from 300 m 29 cm
(viii) 27 cm 8 mm from 74 cm 7 mm
(ix) 37 cm 5 mm from 64 cm 3 mm

Use appropriate units to measure the length of different objects

We measure the length of pencil in centimetres.

The length of pencil is 14 cm.

We measure the length of book in centimetres.

We measure the length of table, room or play ground in metres.

We measure the distance between two cities in kilometres.

Use the correct unit of cm , m and km to fill the each box.

We measure:

1. The length of pen in **cm**
2. The length of bed in ______
3. The length of hockey ground in ______
4. The width of your geometry box in ______
5. The distance from Karachi to Larkana in ______

Example: Tick (✓) the best unit of length for measuring the length of sides of table

(a) 45 mm **(b) 45 cm ✓**
(c) 45 m **(d) 45 km**

Solve real life problems involving conversion, addition and subtraction of units of length

Example 1: Farhan is 1 m 30 cm tall. He stands on a stool 70 cm high. How high is the top of his head from the ground?

Solution:

		m	cm
Farhan's height		① 1 m	30 cm
Height of stool	+		70 cm
		2 m	**00 cm**

[Sum of (30 + 70) cm = 100 cm
100 cm = 1 m
carry 1 m to metre column]

The top of his head is 2 m high from the ground.

Example 2: There are 2 pieces of wood. The first piece measures 5 m 28 cm and the second piece is 3 m 55 cm long. What is the difference between the two?

Solution:

		m	cm
Length of the first piece of the wood		5 m	28 cm
Length of the second piece of the wood	−	3 m	55 cm
		1 m	**73 cm**

The difference between the two pieces of wood is **1** m **73** cm.

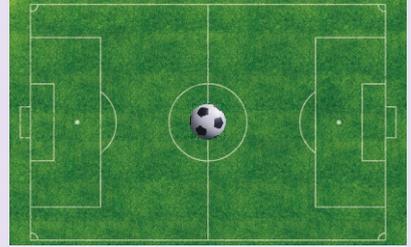
EXERCISE 5.3

1 Choose the best unit of length for the following objects:

(i) The thickness of eraser is:

(a) 2 mm (b) 2 cm
(c) 2 m (d) 2 km

(ii) The length of football ground:

(a) 30 mm
(b) 30 cm
(c) 30 m
(d) 30 km

(iii) The distance between Karachi and Hyderabad by road is:

(a) 165 mm
(b) 165 cm
(c) 165 m
(d) 165 km

Hyderabad

Karachi

2 The length of an iron rod is 2 m 86 cm. How much iron rod is left if 1m 38 cm has been cut off?

3 Ali covered a distance of 789 m from his house to Jamia Masjid and then 368 m from Jamia Masjid to School. Find the total distance covered by him ?

4 A car is 1m 62 cm wide. A garage is 2 m 41cm wide. How much space is left when the car is in the garage?

5 The red part of a colour pencil is 65 mm long. The blue part is 52 mm long. What is the length of full pencil in millimetres and centimetres?

6 In a walking race, in specified time Tariq ran 9 km 200 m, Sajjad ran only 8 km 850 m. How far ahead of Sajjad was Tariq?

7. In a 10 kilometre race, a horse fall down at a distance of 245 m from the winning point. What distance had the horse run before it fall down?
8. Nasir is 142 cm tall. His friend is 8 cm taller than Nasir. How tall is his friend?
9. Saba's house is at a distance of 375 m from school and 505 m from railway station. What is the difference between distances of school and railway station from Saba's home?

5.2 MASS / WEIGHT

The unit of mass is gram (g). Kilograms (kg) are used to weigh heavy objects and grams are used to weigh light objects.

Convert kilograms to grams.

There are 1000 grams in a kilogram.

1 kilogram (kg) = 1000 gram (g)

So, we multiply the numbers of kilograms by 1000 to convert into grams.

Example 1: Convert 15 kg to grams

Solution: 15 kg = 15 x 1000 g = 15000 g

Example 2: Convert 2 kg 250 g into grams

Solution: 2 kg 250 g = 2 x 1000 g + 250 g

= 2000 g + 250 g = 2250 g

Teacher's Note Teacher should explain students to convert the different units of kilograms to gram by multiplication.

Convert the following into grams.

(1) 18 kg = 18 x 1000 = 18000 g

(2) 25 kg = ________ = ________ g

(3) 4 kg 80 g = ________ = ________ g

(4) 5 kg 125 g = ________ = ________ g

3. Addition and subtraction of unit of Mass/Weight

Add and subtract expressions involving similar units of mass/weight.

Example 1:

Add **3 kg 65 g** and **5 kg 30 g**.

Solution:

	kg	g
	3	65
+	5	30
	8	**95**

Total weight = **8 kg 95 g**

Example 2: Subtract **7 kg 650 g** from **9 kg 500 g**.

Solution:

	kg	g
	(8) ~~9~~	(14)(10) ~~5~~00
−	7	650
	1	**850**

Total weight = **1 kg 850 g**

EXERCISE 5.4

1 Add.

(i) 3705 g, 8536 g and 4000 g

(ii) 4 kg 485 g, 2 kg 390 g and 4 kg 425 g

(iii) 8 kg 75 g and 9 kg 46 g

(iv) 4 kg 32 g and 3 kg 85 g

(v) 16 kg 860 g, 23 kg 545 g and 49 kg 360 g

2 Subtract.

(i) 1 kg 250 g from 5 kg

(ii) 3 kg 33 g from 6 kg 86 g

(iii) 4505 g from 9007 g

(iv) 36 kg 740 g from 59 kg 960 g

(v) 14 kg 72 g from 20 kg 40 g

Use appropriate units to measure the mass/weight of different objects.

- To weigh heavy objects we use kilogram.
- To weigh lighter objects we use gram.

For example:

Honey and sweets are measured in grams and kilograms.

Sugar, wheat, rice and flour bags are measured in kilogram.

Packet of tea is measured in grams.

Gold and silver are measured in grams.

Use kg or g.

1. The weight of tooth past is measured in ____g____
2. The weight of bags of flour are measured in________
3. The weight of sugar bag is measured in ________
4. The weight of one paper is measured in ________
5. The weight of one soap is measured in________
6. The weight of potatoes and onions are measured in _____
7. The weight of salt bag is measured in ________
8. The weight of vegetable ghee is measured in ________

Solve real life problems involving conversion, addition and subtraction of units of mass/weight.

Example 1: A rice merchant sold 168 kg 750 g of rice and had 57 kg 650 g left. Find the quantity of rice in the beginning?

Solution:

	kg	g
Weight of rice sold	168	750
Weight of rice left	+ 57	650
	226	**400**

He had 226 kg 400 g rice in the beginning.

Example 2: A hen weighs 2 kg 720 g and a duck weighs 4 kg 240 g. How much heavier is the duck than the hen?

Solution:

	kg	g
Weight of the duck	4	240
Weight of the hen	− 2	720
	1	**520**

The duck is 1 kg 520 g heavier than the hen.

EXERCISE 5.5

1 **Choose the answer in best unit of mass/weight for following objects:**

(i) The mass of a paper clip.
(a) 1 g (b) 1 kg (c) 100 g (d) 100 kg

(ii) The mass of a 13 years old boy.
(a) 4 g (b) 4 kg (c) 40 kg (d) 400 g

(iii) The mass of a box of tea.
(a) 40 g (b) 400 g (C) 4 g (d) 4 kg

(iv) The weight of a watermelon.
(a) 5 kg (b) 50 g (c) 50 kg (d) 500 g

2 A bale of rubber weighs 75 kg 700 g. Another weighs 86 kg 400 g. Find their total weight.

3 Hussain weighs 28 kg 750 g and his father weighs 63 kg 500 g. How much lighter is Hussain than his father?

4 Fozia bought 21 kg 350 g of sweet from one shop. She purchased 1 kg 200 g of sweet from another shop. Find the total weight of sweet she purchased in all?

5 A grain merchant had 3000 kg of peas. He sold 1856 kg 750 g of it. What weight of peas had he left?

5.3 VOLUME / CAPACITY:

(1) Conversion of units of capacity

The basic unit to measure capacity is litres (ℓ). The smaller unit to measure the capacity is millilitre ($m\ell$).

Convert litres to millilitres.

There are 1000 millilitres in a litre.

1 litre (ℓ) = 1000 millilitres ($m\ell$)

In order to convert a litre into millilitres we multiply the number of litres by 1000.

Example 1: Convert 8 litres into millilitres

Solution: 8 ℓ = 8 x 1000 ℓ = 8000 $m\ell$

Convert the following into millilitres.

(1) **15 ℓ** = **15 x 1000** = **15000** $m\ell$.

(2) **40 ℓ** = __________ = __________ $m\ell$.

(3) **75 ℓ** = __________ = __________ $m\ell$.

(4) **66 ℓ** = __________ = __________ $m\ell$.

(2) Addition and Subtraction of Units of Capacity

Add and subtract expression involving units of capacity/volume

Example 1: Add 9 ℓ 800 $m\ell$ and 2 ℓ 300 $m\ell$.

Solution:

	ℓ	$m\ell$
	$\overset{1}{9}$	800
+	2	300
	12	**100**

Total volume = **12 ℓ 100** $m\ell$.

Teacher's Note Teacher should explain the students to convert litres into millilitres by multiplication.

EXERCISE 5.6

(1) Add.

(i) 7 ℓ 420 mℓ and 10 ℓ 500 mℓ

(ii) 2100 mℓ, 4960 mℓ and 3755 mℓ

(iii) 7 ℓ 25 mℓ, 16 ℓ 400 and mℓ, 31 ℓ 251 mℓ

(iv) 705 mℓ, 820 mℓ and 695 mℓ

(v) 14 ℓ 782 mℓ, 17 ℓ 300 mℓ and 26 ℓ 450 mℓ

(2) Subtract.

(i) 719 ℓ from 825 ℓ

(ii) 16 ℓ 415 mℓ from 60 ℓ 600 mℓ

(iii) 640 mℓ from 905 mℓ

(iv) 8 ℓ 205 mℓ from 11 ℓ 150 mℓ

(v) 76 ℓ 223 mℓ from 97 ℓ 660 mℓ

Use appropriate units to measure the capacity/volume of different objects (utensils etc).

- The capacity of milk pack is $\frac{1}{2}$ ℓ or 500 mℓ.
- The capacity of 2nd milk pack is 1 ℓ or 1000 mℓ.
- The capacity of mineral water bottle is 1 litre.
- The capacity of bucket is 5 ℓ or 5000 mℓ.
- The capacity of bowls 250 mℓ, 500 mℓ and 750 mℓ

Choose the appropriate measure of given objects.

1	2	3
25 ml	36 ml	1 ℓ
250 ml ✓	360 ml	10 ℓ
2500 ml	3600 ml	100 ℓ

Solve real life problems involving conversion, addition and subtraction of units of capacity/volume.

Example 1: A plastic tank contains 18 ℓ of water. Ali pours 16 ℓ of water into it, how much water will it contain now?

Solution:

Water in the tank	[1] 18 ℓ
Ali pours	+ 16 ℓ
Total	**34 ℓ**

It will contain 34 ℓ of water in total.

Example 2: Two bottles together contain 200 ℓ of juice. If one of them holds 98 ℓ, how much juice does the other hold?

Solution:

Two bottles contain	[1 9 10] 200 ℓ	of juice
One of them holds	− 98 ℓ	of juice
	102 ℓ	

The other bottle holds 102 ℓ of juice.

EXERCISE 5.7

(1) Choose answer in the best unit of volume for the following objects:

i
4 ℓ, 40 ℓ, 400 ℓ

ii
1 ℓ, 1 mℓ, 2 mℓ

iii
500 ℓ, 500 mℓ, 800 mℓ

iv
4 ℓ, 4 mℓ

v
140 ℓ, 140 mℓ

vi
5 ℓ, 5 mℓ

2. How much water is left if 19 mℓ are taken from a cup holding 28 mℓ.

3. The bath tub in Sara's house requires 850 ℓ of water to fill. It now holds 552 ℓ. How many more litres are needed to fill the bath tub?

4. A container contains 98 ℓ 300 mℓ of oil. If 51 ℓ 700 mℓ more of oil is added to it. How much oil will there be in the tank altogether?

5. A milk van carried 272 ℓ of milk. 35 ℓ 875 mℓ of the milk were spilt in an accident. How much milk was left?

6. A water drum contains 500 ℓ of water. After watering the flowers, 260 mℓ of water is left. How much has been used to water the flowers?

7. There is 1 ℓ 10 mℓ of syrup in a bottle and in another bottle contains 2 ℓ 75 mℓ. Find the total quantity of syrup in both bottles.

8. There is 80 ℓ 750 mℓ of diesel in the tank of a bus. How much diesel must be added to make it 100 ℓ?

5.4 TIME

A clock has three hands.
The shorter hand is called **hour hand.**
The longer hand is called **minute hand**.
The thinnest hand is called **second hand**.
The hour hand goes round the clock twice a day.
The minute hand goes round the clock 24 times a day.
The second hand takes 60 little jerks to go round the clock in a minute. We already know that:

TIME MEASUREMENT

1	hour	=	60	minutes
1	day	=	24	hours
1	week	=	7	days
52	weeks	=	1	year
1	year	=	12	months

MAY 2014

Mon	Tue	Wed	Thu	Fri	Sat	Sun
*	*	*	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	*

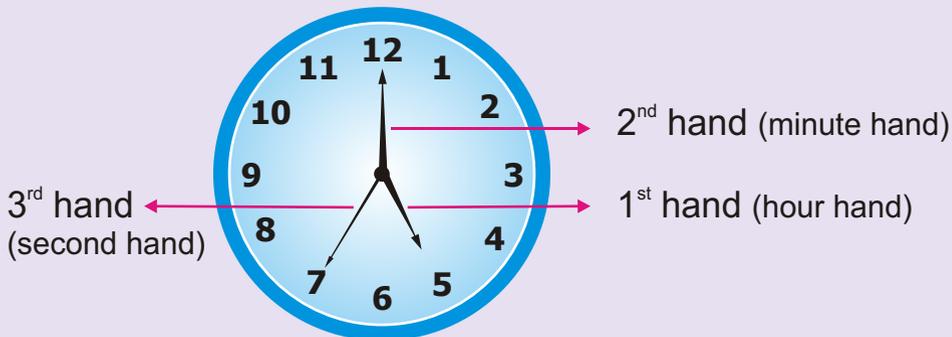
Conversion of units of time

Read time in hours, minutes and seconds

We have learnt each day has 24 hours .
A day ends at 12 midnight and a new day begins at same time after 12 midnight .

- The time between 12 midnight and 12 noon is called a.m. It means in the late night and morning.
- The time between 12 noon and 12 midnight is called p.m. means in the afternoon, evening and night.

Teacher's Note Teacher should revise different time measurements to the students.

Look at this clock. It has 3 hands.

The third hand is long and thin. It moves faster than other two hands. It moves in short jerks. Each jerk made by this hand marks the passing of one second.

The second is the smallest unit of time.

1 minute contains 60 seconds.

1 minute = 60 seconds

The 3^{rd} hand takes 60 little jerks to go clock wise round the clock, when 60 seconds are complete a minute has passed.

How many jerks will the second hand make in one hour?

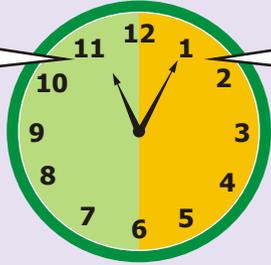
60 x 60 = 3600 seconds
Or
1 hour = 3600 seconds

Use a.m. or p.m.

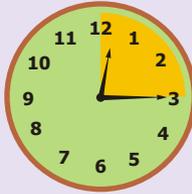
1. 8'o clock in the morning **8 a.m**
2. 5'o clock in the evening ______
3. 1'o clock in the morning ______
4. 9'o clock at night ______
5. 2 hours before midnight ______

a.m stands for ante meridien p.m stands for post meridien

Look at the dial of the clock. We divide it in two parts.

If the minute hand is on left side, we say to the hour.

If the minute hand is on right side, we say past the hour

quarter to 12

11:45

quarter past 12

5 minutes to 4

10 minutes past 6

Activity 2 Write time in words and in numbers.

(i)

5 minutes to 3

2:55

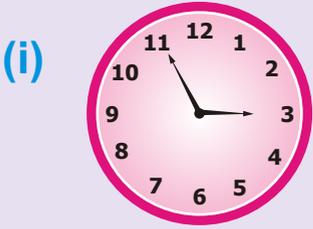
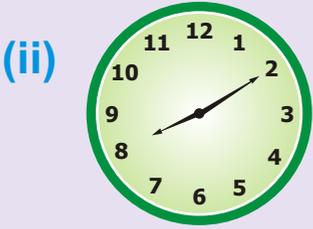
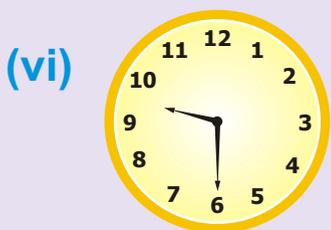
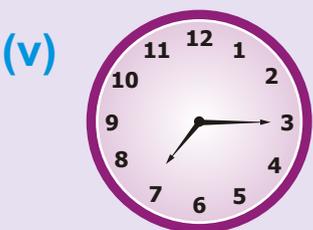
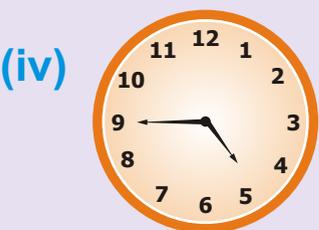
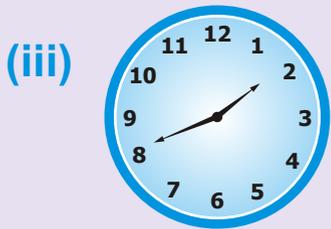
(ii)

10 minutes past 8

(iii)

(iv)

(v)

(vi)

Convert hours to minutes and minutes to seconds.

(a) Convert hours into minutes:

We multiply the number of hours by 60 to convert hours into minutes.

Example 1: **Convert 3 hours 15 minutes into minutes**

Solution: 3 h 15 m = 3 x 60 + 15
= 180 + 15 = 195 min.

Activity 1 **Convert the following into minutes.**

(1) **2 h 10 min** = 2 x 60 + 10 = 130 minutes.

(2) **3 h 32 min** = ________ = ________ minutes.

(3) **1 h 45 min** = ________ = ________ minutes.

(4) **5 hours** = ________ = ________ minutes.

(b) Conversion of minutes to seconds.

We multiply the minutes by 60 to convert into seconds.

Example 1: **Convert 4 minutes into seconds.**

Solution: 4 min = 4 x 60 sec = 240 seconds

Example 2: **Convert 3 minutes 20 seconds**

Solution: 3 minutes 20 seconds = 3 x 60 sec. + 20 sec.
= 180 + 20 sec = 200 seconds

Activity 2 **Convert the following into seconds.**

(1) **47 min** = 47 x 60 = 2820 seconds.

(2) **1 min 5 sec** = ________ = ________ seconds.

(3) **12 min 15 sec** = ________ = ________ seconds.

(4) **45 min 10 sec** = ________ = ________ seconds.

(5) **59 min** = ________ = ________ seconds.

Teacher's Note

Teacher should explain the students to convert the hour into minutes and minutes into seconds through multiplication by 60.

Convert years to months, months to days and weeks to days

(a) Conversion of years to months:

We multiply the number of years by 12 to convert it into months.

Example 1: **Convert 3 years to months**

Solution: There are twelve months in a year.

So, 3 years = 3 x 12 months = 36 months

Example 2: **Convert 4 years 8 months to months**

Solution: 4 years 8 months = 4 x 12 months + 8 months

= 48 months + 8 months = 56 months

Convert the following into months.

(1) **2 years** = 2 x 12 = 24 months.

(2) **5 years 2 months** = ______ = ______ months.

(3) **10 years 8 months** = ______ = ______ months.

(4) **7 years 6 months** = ______ = ______ months.

(b) Conversion of months to days.

We multiply the months by 30 to convert them into days.

Example 1: **Convert 5 months to days**

Solution: 5 months = 5 x 30 days = 150 days

Example 2: **Convert 2 months 20 days into days.**

Solution: 2 months 20 days = 2 x 30 days + 20

= 60 + 20 days = 80 days

Convert the following into days.

(1) **4 months 10 days** = 4 x 30 + 10 = 130 days.

(2) **6 months 4 days** = ______ = ______ days.

(3) **9 months 20 days** = ______ = ______ days.

(4) **18 months 15 days** = ______ = ______ days.

(c) Conversion of weeks to days.

We multiply weeks by 7 to convert into days.

Example 1: **Convert 5 weeks into days.**

Solution: 5 weeks = 5 x 7 days = 35 days

Example 2: **Convert 2 weeks 4 days into days.**

Solution: 2 weeks 4 days = 2 x 7 days + 4 days = 18 days

EXERCISE 5.8

(1) Convert the following into months.

(i) **5 years**
(ii) **8 years 6 months**
(iii) **4 years 9 months**
(iv) **10 years 2 months**
(v) **15 years 8 months**
(vi) **20 years 10 months**

(2) Convert the following into days.

(i) **3 months**
(ii) **3 months 12 days**
(iii) **8 months 20 days**
(iv) **4 months 25 days**
(v) **10 months 28 days**
(vi) **2 months 15 days**

(3) Convert the following into days.

(i) **8 weeks**
(ii) **25 weeks 3 days**
(iii) **17 weeks 6 days**
(iv) **30 weeks**
(v) **35 weeks 5days**
(vi) **41 weeks 2 days**

Addition and subtraction of units of time

Add and subtract units of time without carrying/borrowing

Example 1: Add 15 minutes 35 seconds and 30 minutes 20 seconds.

Solution:

	Minutes	Seconds
	1 5	3 5
+	3 0	2 0
	4 5	5 5

Therefore, sum is 45 min 55 sec.

Example 2: Subtract 25 minutes 32 seconds from 46 minutes 48 seconds.

Solution:

	Minutes	Seconds
	4 6	4 8
–	2 5	3 2
	2 1	1 6

Therefor, difference is 21 min 16 sec.

EXERCISE 5.9

(A) Add:

1. 45 minutes 38 seconds and 30 minutes 40 seconds.
2. 48 minutes 39 seconds and 37 minutes 20 seconds.
3. 28 hours 10 minutes and 31 hours 20 minutes.
4. 25 hours 20 minutes and 34 hours 15 minutes.

(B) Subtract:

1. 48 minutes 39 seconds from 59 minutes 49 seconds.
2. 35 minutes 25 seconds from 55 minutes 35 seconds.
3. 32 hours 12 minutes from 45 hours 46 minutes.
4. 23 hours 10 minutes from 54 hours 30 minutes.

Solve simple real life problems involving conversion, addition and subtraction of units of time

Example 1: Nazia takes 1 hour 15 minutes to complete her Maths home work and 1 hour to complete her English home work. How much time she takes to complete both home works?

Solution:

	Hours	Minutes
Time taken to complete Maths homework:	1	15
Time taken to complete English homework:	+ 1	00
Total time taken:	**2**	**15**

Total time taken = 2 hours 15 minutes.

Example 2: Hamdan takes 1 hour 30 minutes to play cricket, while his brother Hammad takes 1 hour 15 minutes to play cricket. How much more time Hamdan takes to play cricket?

Solution:

	Hours	Minutes
Time taken by Hamdan	1	~~3~~0 (2 10)
Time taken by Hammad	– 1	15
Difference	**0**	**15**

Hamdan takes 15 minutes more to play cricket.

EXERCISE 5.10

1. Rafique took 25 minutes 30 seconds to reach his school while 23 minutes 25 seconds to come back from school. How much total time he takes to go and come back from school?
2. Pakistani cricket team took 4 hours 25 minutes to complete their innings, while Indian cricket team took 3 hours 20 minutes to complete their innings. How much total time both the teams took to complete their innings?
3. Ahsan takes 42 minutes 54 seconds to complete a job, while his friend takes 32 minutes 12 seconds to complete the same job. How much more time does Ahsan take to complete the job?
4. A train takes 19 hours 48 minutes to reach from Lahore to Karachi, while another train takes 17 hours 23 minutes. Find the difference between the times taken by the two trains.
5. Momal spent 53 minutes 47 seconds to watch television while Zahid spent 39 minutes 23 seconds to watch the television. Find the difference in their time.

REVIEW EXERCISE

1 Tick (✓) the correct answer.

(i) 1 centimetre is equal to
(a) 100 mm (b) 10 mm (c) 1000 mm

(ii) 1 kilometre is equal to
(a) 1000 m (b) 100 m (c) 10 m

(iii) 1 litre is equal to
(a) 100 *ml* (b) 10 *ml* (c) 1000 *ml*

(iv) The number of hours in a day is
(a) 12 (b) 24 (c) 30

2 List four lengths that would be measured by using km.

(i) Distance of two towers (ii) ________

(iii) ________ (iv) ________

3 Convert these lengths into kilometres.

(i) 6000 m = ________ (ii) 3500 m = ________

4 Convert these lengths into metres.

(i) 15 km = ________ (ii) 3 km = ________

5 Add:

(i) 30 km 43 m and 18 km 84 m
(ii) 48 m 65 cm and 38 m 76 cm
(iii) 13 *ℓ* 800 *ml* and 12 *ℓ* 700 *ml*
(iv) 44 kg 380 g and 38 kg 960 g

6 Subtract:

(i) 40 km 65 m from 76 km 72 m
(ii) 43 m 81 cm from 72 m 34 cm
(iii) 4 *ℓ* from 12 *ℓ* 250 *ml*
(iv) 45 kg 325 g from 86 kg 638 g

GEOMETRY

6.1 GEOMETRY BOX

Geometry Box contains different types of instruments which are used for measurement and drawing geometrical figures.

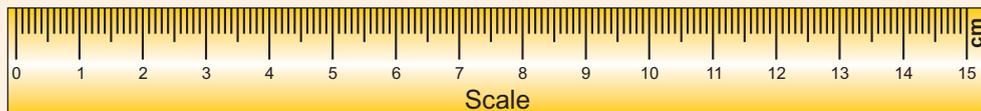
Know instruments of a Geometry Box. i.e., pencil, straightedge/ ruler, compasses, dividers, set squares and protractor.

A geometry box contains the following instruments:

(1) Pencil and Eraser

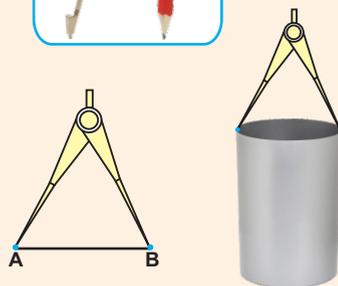
Pencil is used for drawing figures and other lines, arcs, angles etc. Where as erasers are used to delete or correct the figures.

(2) Ruler (straightedge)

It is used to measure the length of a given line segment. It is also used in drawing line segment of given or required length.

(3) Compasses (a pair of compasses)

Compasses are used to draw arcs, circles and marking distance.

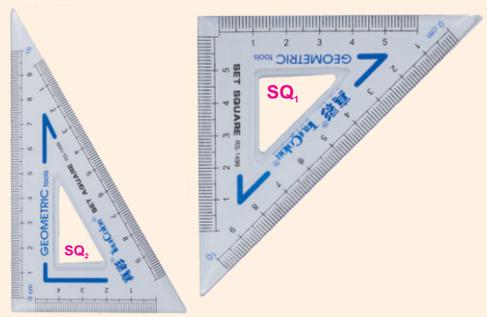
(4) Dividers (a pair of dividers)

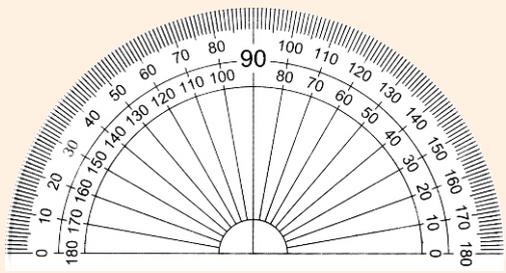
A pair of dividers is used to measure the length of a line segment and the diameter of hollow cylinder.

Teacher's Note

Teacher should show the geometry box and instruments to the students in the class room.

(5) Set squares

Set squares are used to draw a line parallel or perpendicular to a given line. It is also used to draw angles of 30°, 45°, 60° and 90°.

SQ₁ SQ₂

(6) Protractor

Protractor is used to measure an angle or to draw an angle of a given measure, between 0 and 180 degrees

Recognize the use of pencils of grade H and HB

Pencils used are of two grades.

(i) Pencil of grade H
H stands for hardness

(ii) Pencil of grade HB.
HB stands for blackness

H grade pencil

HB grade pencil

The line drawn with pencil H grade is very thin. In this pencil the lead leaves light black colour impression.

The line drawn with HB grade is bold. In this pencil the lead leaves dark black colour impression.

Demonstrate the use of H and HB pencils by drawing different lines

Look at these pencils

The line drawn with pencil of grade H is very thin.

The line drawn with pencil of grade HB is bold.

Draw the following diagrams with *H* and *HB* grade pencils.

(i) Line segment (ii) Square (iii) Circle

Take a point A. From point A draw $\overline{AB}$ with the help of any straightedge. Draw another $\overline{AC}$ from point A. How many lines can be drawn from point?

Take a pair of dividers. Penetrate the pointed ends on a paper. Name the two marks as A and B. Now draw lines with the help of straightedge; so that they may pass through both the points A and B.

6.2 LINE

In previous class, we learnt that a line consists of a set of infinite points. A line has no end point.

A B

It is a line which shows infinite number of points.

Measure the length of a line in centimetres and millimetres using straightedge/ruler and dividers

To draw a line segment using straightedge / ruler.

Step 1. Take two points (say A and B).

Step 2. Join A and B, using your ruler and pencil.

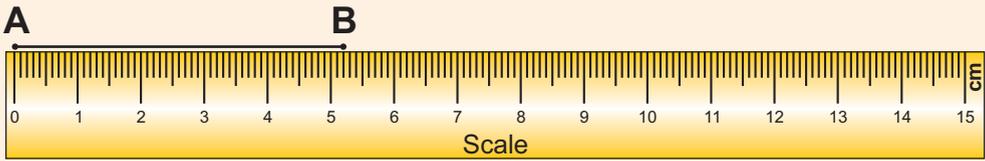
A B

A B

Step 3. Thus we get a part of a line which has two end points called the line segment.

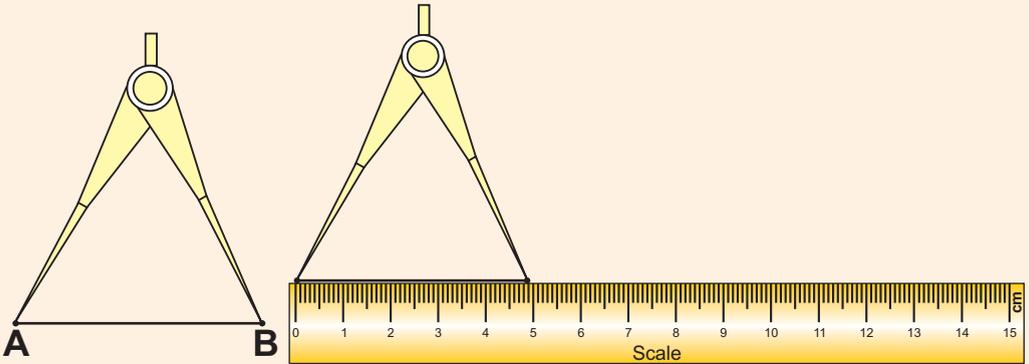
Teacher's Note

Teacher may organise activities and engage the students to draw and measure line segment in their own copies.

Activity 2 Measuring the length of a line segment with ruler.

Step 1. Place a ruler with its edge along $\overline{AB}$ such that zero (0) mark of the ruler faces the point A.

Step 2. Read the mark on the ruler which faces the point B.

Step 3. This gives us the length of AB. Thus the length of $\overline{AB}$ is 5 cm 2 mm i.e. 5.2 cm. Symbolically, we write $m\,\overline{AB} = 5.2$ cm.

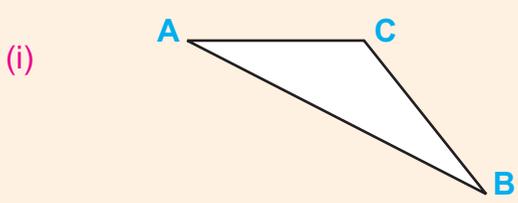
Activity 3 Measuring the length of line segment with divider.

Step 1. Open the divider so that the end point of one of its arms is at A and the point of the second arm is at B.

Step 2. Lift the divider without disturbing it and place it on the ruler so that the end point of one arm is at zero (0) mark.

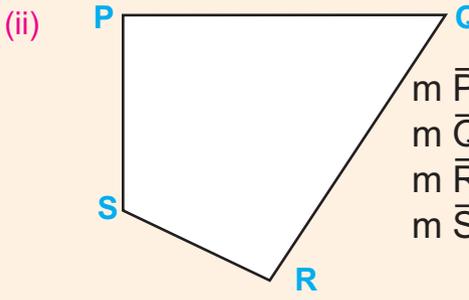
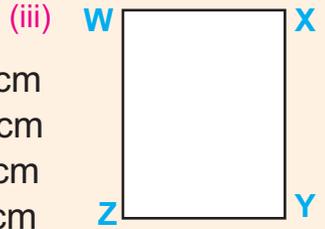
Step 3. Read the mark against the end point of the second arm of the divider.

Step 4. We find the length of $\overline{AB}$ to be 4.9 cm or we write $m\,\overline{AB} = 4.9$ cm

EXERCISE 6.1

1. Measure the sides of the following figures with ruler and write their lengths:

(i)
$m\overline{AC}$ = ________cm
$m\overline{AB}$ = ________cm
$m\overline{CB}$ = ________cm
$m\overline{BC}$ = ________cm

(ii)
$m\overline{PQ}$ = ________cm
$m\overline{QR}$ = ________cm
$m\overline{RS}$ = ________cm
$m\overline{SP}$ = ________cm

(iii)
$m\overline{WX}$ = ____ = $m\overline{YZ}$ = ____
$m\overline{XY}$ = ____ = $m\overline{ZW}$ = ____

2. Join the pair of points given below, to draw line segments, then measure the length of each of the line segments with the ruler and write its length. Verify the length by divider.

(i) P .... Q

Length of $\overline{PQ}$ is 8.5 cm

(ii) S . . T

Length of $\overline{ST}$ is_____cm

(iii) F . . G

Length of $\overline{FG}$ is_____cm

(iv) Y . . Z

Length of $\overline{YZ}$ is_____cm

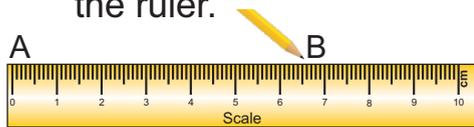
(v) M . . N

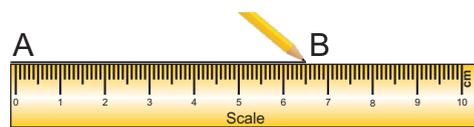
Length of $\overline{MN}$ is_____cm

Draw a straight line of given length using a straightedge/ruler and dividers

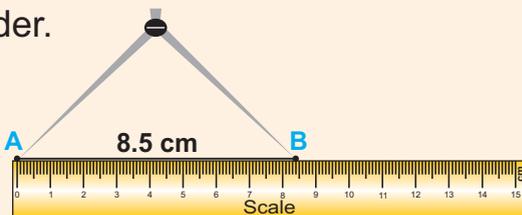
Let's draw a line segment 6.5 cm long using ruler.

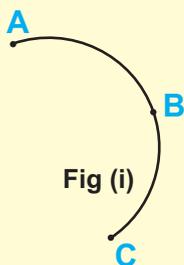
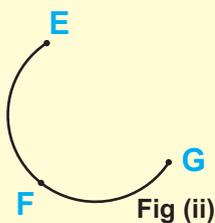
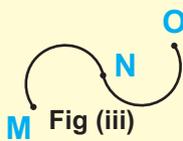
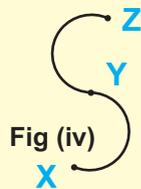
1st Step

(i) Take any point A.
(ii) Place the 0 (zero) of the ruler against point A.
(iii) Put another point B with pencil against 6.5 cm of the ruler.

2nd Step

(i) Join points A and B using the ruler or any straight edge.

Thus a straight line AB is drawn whose length is 6.5 cm

To draw a straight line of 8.5 cm using dividers.

Step 1. Take a point A on a sheet of paper.
Step 2. Place one end of the divider at zero mark on ruler.
Step 3. Open the divider so that the other end of the divider is on the mark of 8.5 cm on the ruler.
Step 4. Without changing the openings of dividers, place one end at A and put a point B with another end of the divider.
Step 5. Join A and B.
Step 6. Thus, we obtain a straight line AB of required length 8.5 cm.

Teacher's Note Help the students to draw lines of different measure in their own copy.

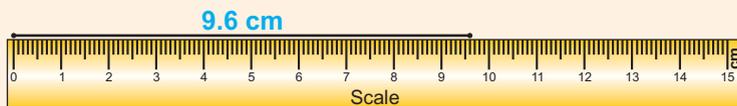
Draw a curved line and measure its length using thread/dividers and straightedge / ruler.

These are curved lines. Curved lines can be drawn by moving pencil in different directions. We can measure its length by using thread/divider and ruler. Measure other curved lines.

Measure curved line of Fig (i) with thread and ruler.

Step 1. Take a piece of thread.

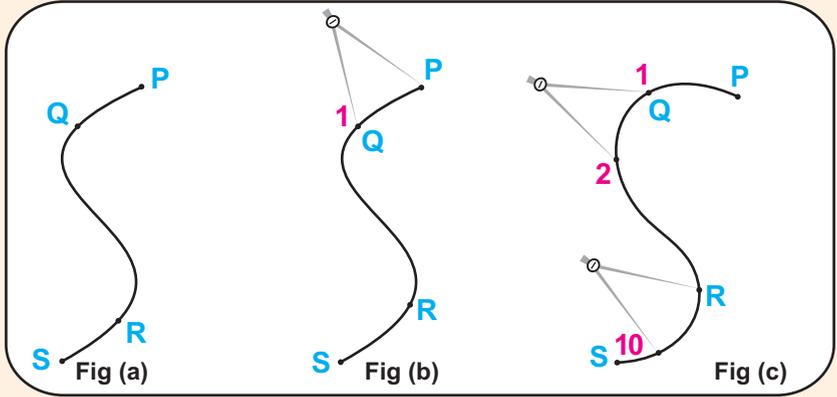
Step 2. Place one end of the thread at point A.

Step 3. Spread the thread along the path from A to B and then from B to C.

Step 4. Put a mark on the thread or cut it with a pair of scissors.

Step 5. Measure the length of the thread with the help of ruler which is **9 cm 6 mm** or **9.6 cm**.

Step 6. In this way the length of the said curved line **ABC** is **9.6 cm**.

Teacher's Note Teacher may help the students to draw some curved lines in their copies and measure their lengths with thread or scale.

Measure curved line PQRS fig. (a) with dividers and ruler.

Step 1: Open the arms of divider **1 cm** apart.

Step 2: Place one arm at **P** so that the other arm reaches at **1** see fig (b).

Step 3: Hold firm arm at No. **1**, rotate the line arm to fall at No. **2** see fig (c).

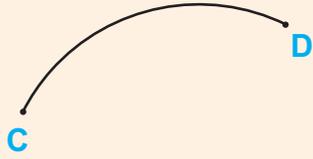
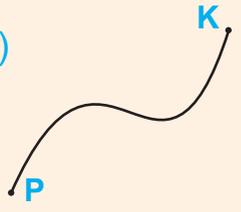
Step 4: Repeat the above process again and again to reach at No. **10** see fig. (c).

Step 5: Remaining part of the curved line is not a complete unit. Open divider touching points S and No. **10**. Place it on the ruler so that one arm is at **0** (zero). Read the other point. Suppose the second arm falls at **5 mm**. Hence the required length of the curved line **PQRS** is **10.5 cm.**

EXERCISE 6.2

1. Draw line segments of following lengths. Using (a) ruler (b) ruler and dividers.

(i) $m\overline{AB} = 7.4$ cm	(ii) $m\overline{BC} = 6.6$ cm	(iii) $m\overline{CD} = 5.7$ cm
(iv) $m\overline{DE} = 3.8$ cm	(v) $m\overline{EF} = 4.9$ cm	(vi) $m\overline{PQ} = 6.0$ cm

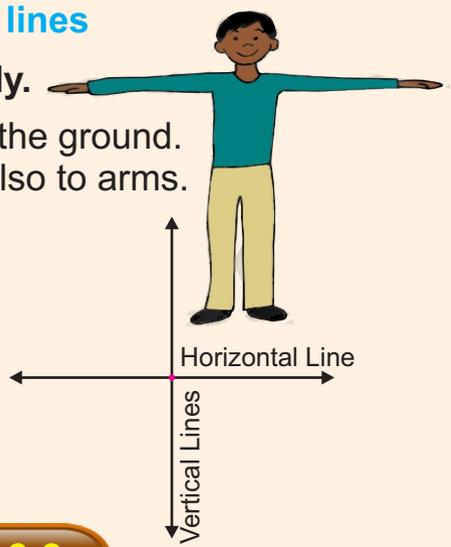
2. Measure these curved lines with thread, ruler and dividers and write their lengths.

Length ______ cm Length ______ cm Length ______ cm

Recognize horizontal and vertical lines

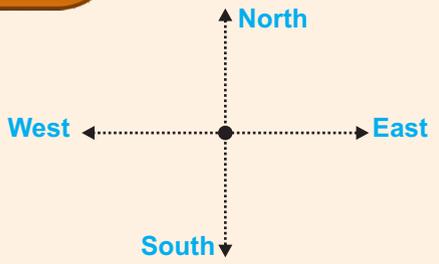
Look at stretched arms of the body.

Arms represent a line **horizontal** to the ground. Body is **vertical** to the ground and also to arms.

Thus we get a horizontal line ⟷ and a vertical line ↕ which intersect each other at a point.

Note: Horizontal and vertical lines have arrow marks, which represent direction.

EXERCISE 6.3

Look at the directions North, South, East and West shown on Horizontal and Vertical lines and fill in the blanks.

North
West
East
South

(1) Horizontal line shows____________directions.

(2) Vertical line shows____________directions.

(3) North to South direction represents____________line.

(4) West to East direction represents____________line.

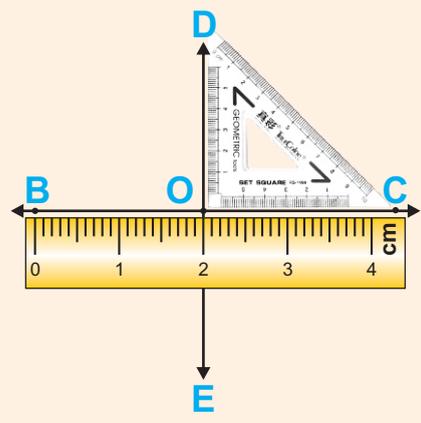
Teacher's Note Teacher may show the students horizontal and vertical lines with back of chair, window pan, sides of table, blackboard and corner of book with both hands of a clock at the time 6 o'clock and 15 minutes past.

Draw a vertical line on a given horizontal line using set squares

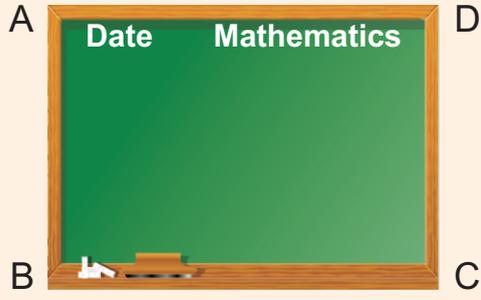
Draw a vertical line $\overleftrightarrow{DE}$ on a given horizontal line $\overleftrightarrow{BC}$.

Step 1. Draw a horizontal line $\overleftrightarrow{BC}$.

Step 2. Place ruler edge along $\overleftrightarrow{BC}$.

Step 3. Along the side of the ruler edge, place a set square. Now slide it until its square corner meet the point O at which the vertical line is to be drawn.

Step 4. Draw $\overleftrightarrow{DO}$ as shown in the figure. Then extend $\overrightarrow{DO}$ to E. Thus we get a vertical line $\overleftrightarrow{DE}$ on a given horizontal line $\overleftrightarrow{BC}$.

Recognize parallel and non-parallel lines

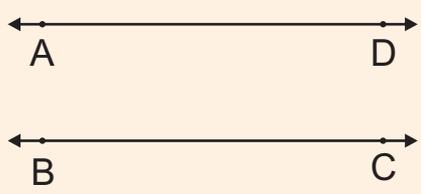
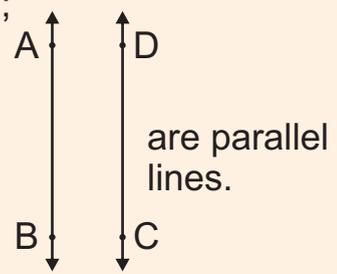
Look at these pictures:

The opposite edges of the black board are;

A D

B C

and

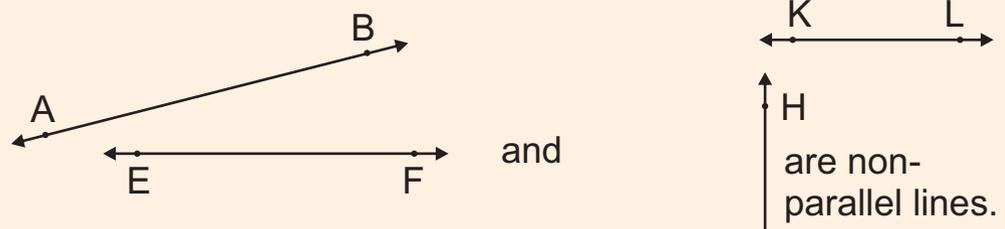
A D

B C

are parallel lines.

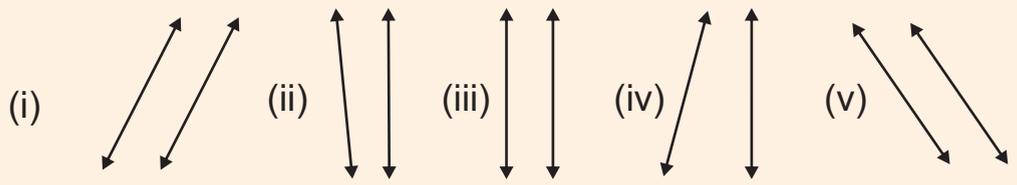
$\overleftrightarrow{AD}$ is parallel to $\overleftrightarrow{BC}$ and $\overleftrightarrow{AB}$ is parallel to $\overleftrightarrow{DC}$. Similarly the two lines of the railway track are parallel.

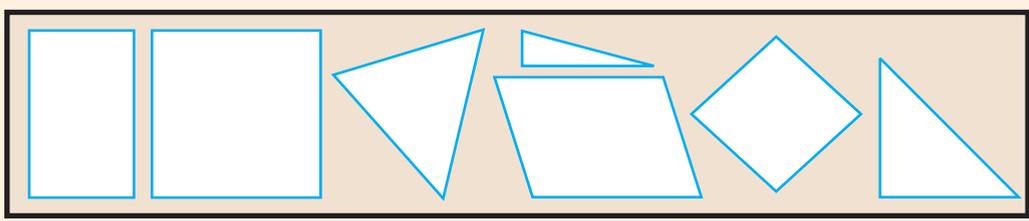
On the contrary, the following pair of lines are non-parallel lines because they will meet or intersect if extended.

and

are non-parallel lines.

Hence parallel lines are those lines which do not intersect, however long they are extended.

Identify parallel and non-parellel lines from a given set of lines

Example: Identify parallel and non-parallel lines.

Here (i), (iii) and (v) are all pair of parallel lines.
But (ii) and (iv) are pair of non-parallel lines.

Cross (✗) the shapes which represent parallel lines and (✓) the shapes which represent non-parallel lines.

Teacher's Note

Teacher should give examples from real life situation to recognized the parallel and non-parallel lines.

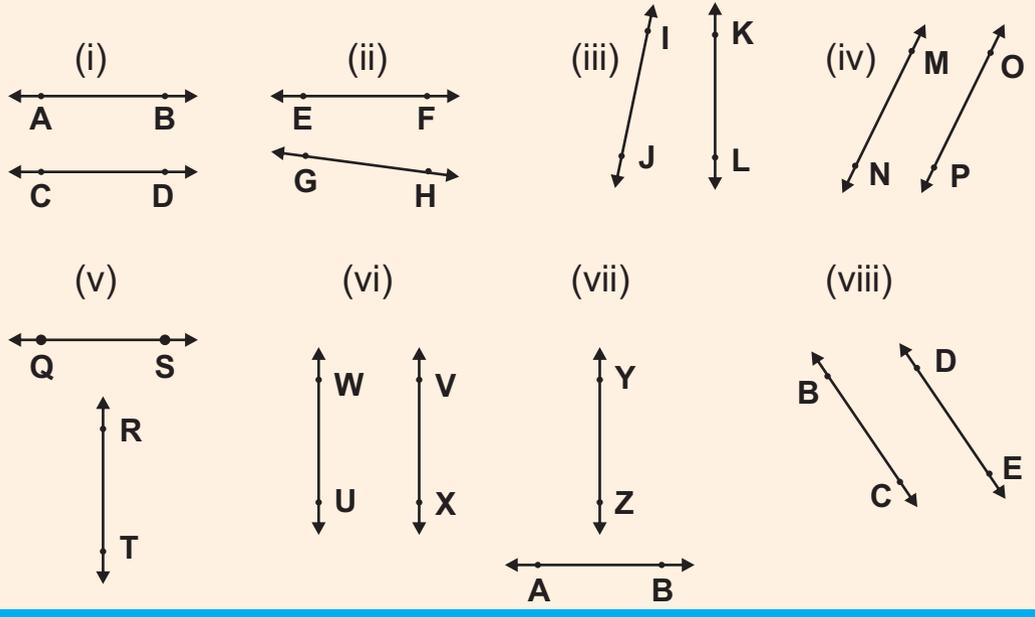
Write down some pairs of:

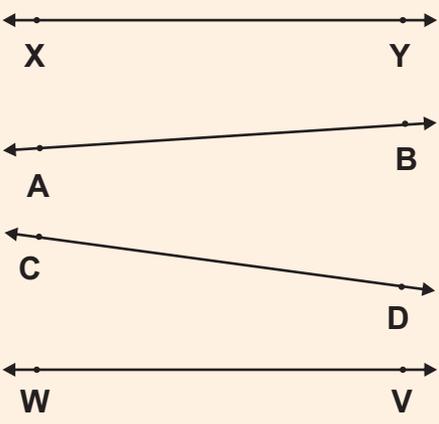
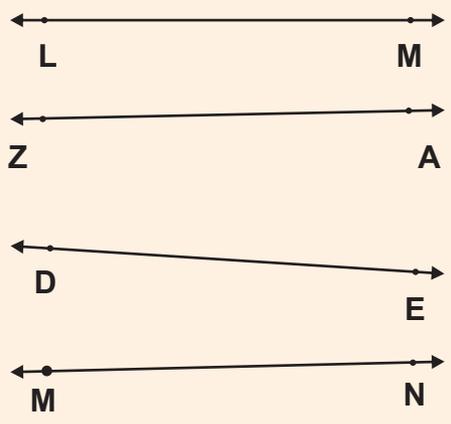
Parallel lines	Non-Parallel lines
1. Edges of the black board	1. Sides of triangle
2.	2.
3.	3.
4.	4.
5.	5.

Observations:

(1) Pair of parallel lines never meet; how far they are extended.
(2) Pair of non-parallel lines will meet and intersect each other.

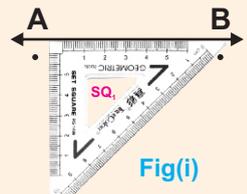
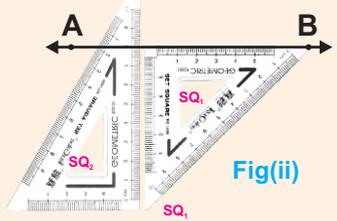
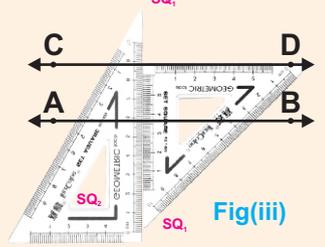
EXERCISE 6.4

1. Identify parallel and non-parallel lines from the following set of lines.

Teacher's Note Teacher may ask the students to verify the above mentioned observations in their copies.

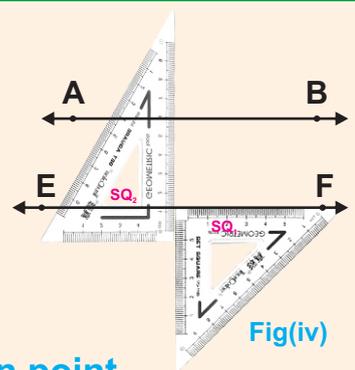
2. Tick (✓) the lines which are parallel to $\overleftrightarrow{XY}$?

3. Cross (✗) the lines which are non-parallel to $\overleftrightarrow{LM}$?

Draw a parallel line to a given straight line using set squares

Draw a line (or lines) parallel to $\overleftrightarrow{AB}$.

Step 1. Draw given lines $\overleftrightarrow{AB}$.

Step 2. Place the edge of one set square (SQ_1) along $\overleftrightarrow{AB}$ as shown in fig. (i)

Step 3. Place another set square (SQ_2) adjacent to the previous one (fig ii). Now SQ_1 is ready to slide up and down along SQ_2.

Step 4. Holding firm SQ_2, slide up SQ_1 and draw $\overleftrightarrow{CD}$ as shown in fig (iii) Therefore $\overleftrightarrow{AB}$ is parallel to $\overleftrightarrow{CD}$.

Step 5. Holding firm SQ_2, slide down SQ_1, and draw $\overleftrightarrow{EF}$ as shown in fig (iv)

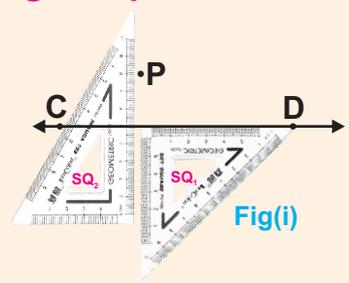
Therefore $\overleftrightarrow{AB}$ is parallel to line $\overleftrightarrow{EF}$.

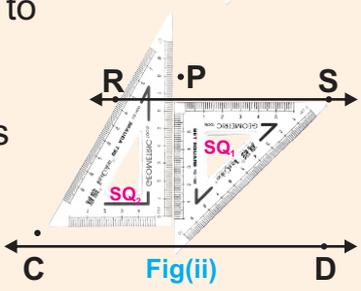
Fig(iv)

Draw a line which passes through a given point and isparallel to a given line (using set - squares)

Draw a line $\overleftrightarrow{RS}$ parallel to a given line $\overleftrightarrow{CD}$ and passing through a given point P.

Step 1. Draw given $\overleftrightarrow{CD}$ and take point P out side it.

Step 2. Place the set squares as explained previously and shown in figure (i).

Fig(i)

Step 3. Holding fast SQ_2, slide up SQ_1 to reach at point P.

Step 4. Draw $\overleftrightarrow{RS}$ passing through P as shown in figure (ii).

Therefore $\overleftrightarrow{CD}$ is parallel to $\overleftrightarrow{RS}$ which is passing through the point P.

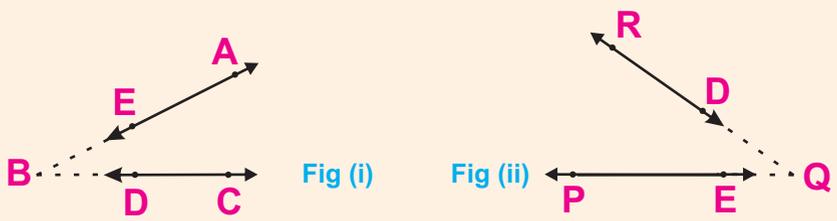
Fig(ii)

EXERCISE 6.5

1. Draw a vertical line $\overleftrightarrow{PQ}$ on a given horizontal line $\overleftrightarrow{XY}$; using set squares.
2. Draw a parallel line $\overleftrightarrow{YZ}$ to a given line $\overleftrightarrow{PQ}$ using set squares.
3. Draw $\overleftrightarrow{AB}$ which passes through a given point E and is parallel to a given $\overleftrightarrow{CD}$ (using set squares)

6.3 ANGLE

Recognize an angle through non-parallel lines

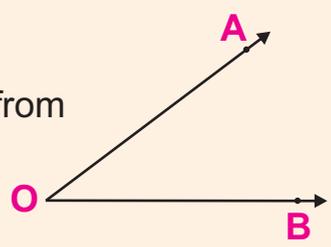
Look at the two non-parallel lines $\overleftrightarrow{AE}$ and $\overleftrightarrow{CD}$ fig (i)

These lines are produced to meet at point B and make an angle ABC. Thus two non-parallel lines have a common end point. Here the common end point is B.

Again look at the two non-parallel lines $\overleftrightarrow{PE}$ and $\overleftrightarrow{RD}$ fig (ii). These lines are produced to meet at point Q and make an angle PQR. Here Q is the common end point of line $\overleftrightarrow{RQ}$ and $\overleftrightarrow{PQ}$

Draw an angle AOB with vertex (O) and arms ($\overrightarrow{OA}$, $\overrightarrow{OB}$) to recognize the notation $\angle$AOB for an angle AOB

Draw an angle.

Step 1: Draw $\overrightarrow{OB}$.

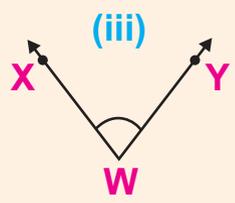
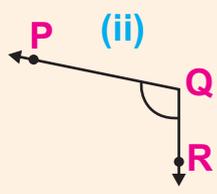
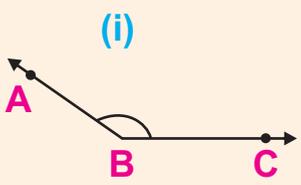
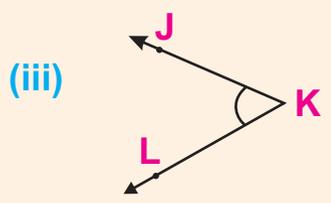
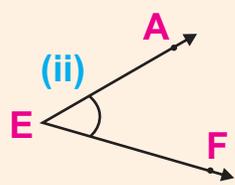
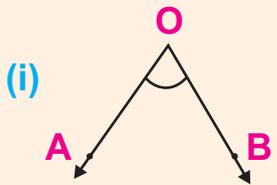
Step 2: Draw another $\overrightarrow{OA}$ (not along $\overrightarrow{OB}$) from point O. This is an angle AOB (or angle BOA)

The common end point O is the vertex of angle AOB.

$\overrightarrow{OA}$ and $\overrightarrow{OB}$ are arms of angle AOB.

The symbol for angle is $\angle$

So angle AOB is written as $\angle$AOB or $\angle$BOA

EXERCISE 6.6

1. Write the names of vertex and arms each of the following angles.

2. Write the following angles in symbols:

Recognize right angle through horizontal and vertical lines

Look at the following pairs of horizontal and vertical lines.

When vertical and horizontal lines meet at a point they form a right angle. In figure (i) ABC is a right angle.

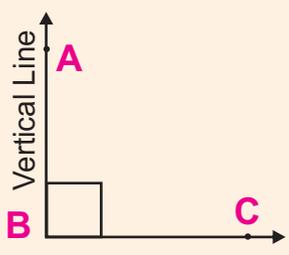
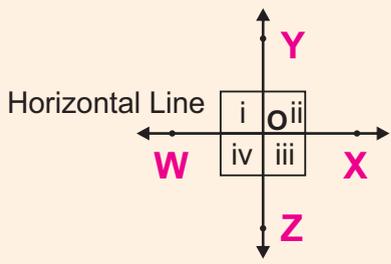



Fig (i) Fig (ii)

In figure (ii), the pairs of horizontal and vertical lines intersect each other at a point O and form four right angles. Hence

(i) ∠WOY is a right ∠ (ii) ∠XOY is a right ∠

(iii) ∠XOZ is a right ∠ (iv) ∠ZOW is a right ∠

To make four right angles by folding a paper sheet.

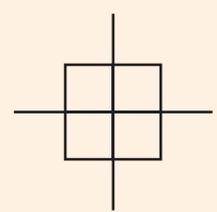
Step 1. Take a piece of paper. Fold it into two halves and then into four quarters.

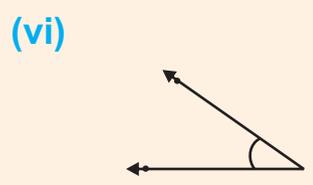
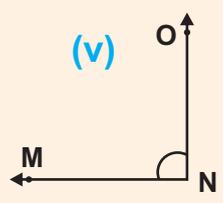
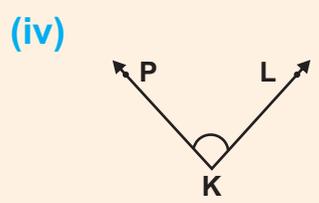
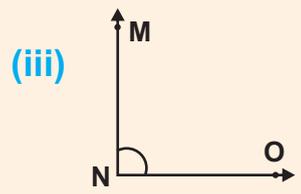
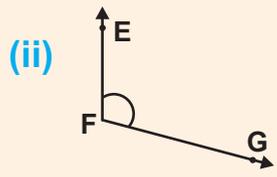
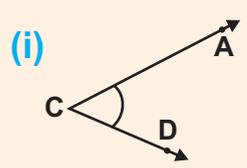
Step 2. Draw lines on the creases of the paper.

Step 3. Name horizontal line as $\overleftrightarrow{CD}$ and vertical line as $\overleftrightarrow{AB}$. They intersect each other at point O.

Step 4. They form four right angles.

Step 5. We can write their names symbolically.
$\angle AOC$, $\angle COB$, $\angle BOD$ and $\angle DOA$.

Note: We can draw square in each right angle at its vertex.

EXERCISE 6.7

1. Look at the following angles and tick (✓) all those that are right angles.

2. Which of the following figures show right angles?

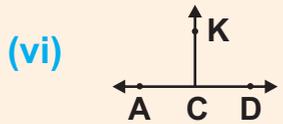
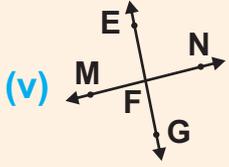
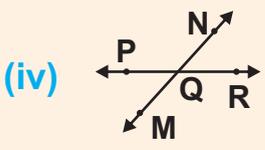
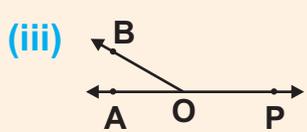
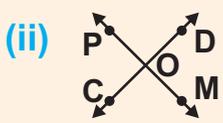
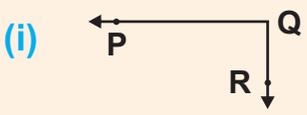
(i)

(ii)

(iii) B, A, O, P

(iv) N, P, Q, R, M

(v) E, N, M, F, G

(vi) K, A, C, D

Demonstrate acute and obtuse angles via the right angle

Draw a right angle.

Fig (i)

Step 1. Draw a horizontal line $\overrightarrow{AB}$.

Step 2. At point A, draw a dotted vertical line $\overrightarrow{AC}$.

Step 3. So $\angle BAC$ is a right angle. See fig (i)

Draw an acute angle.

C, D, A, B

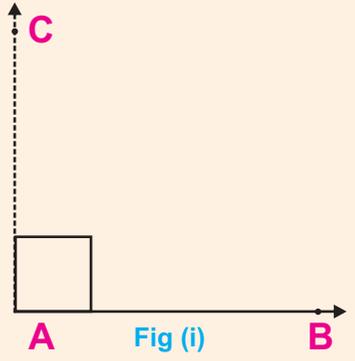



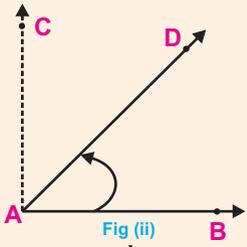
Fig (ii)

Step 1. Draw a third line $\overrightarrow{AD}$ between $\overrightarrow{AC}$ and $\overrightarrow{AB}$ as shown in fig (ii).

Step 2. We have another angle BAD (or $\angle$ DAB).

Step 3. $\angle$ BAD is smaller than $\angle$ BAC because the curved arrow (↶) is stopped by arm $\overrightarrow{AD}$ before reaching the arm $\overrightarrow{AC}$.

Step 4. Thus $\angle$ BAD is less than a right angle $\angle$ BAC.

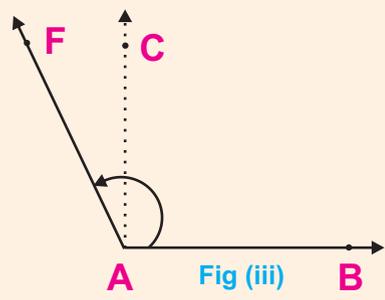
Step 5. Hence $\angle$ BAD is the required acute angle.

> An angle which is less than a right angle is called an acute angle.

Activity 3 Draw an obtuse angle.

Step 1. Draw a line $\overrightarrow{AF}$ outside the right angle BAC to get another angle BAF, as shown in figure (iii).

Step 2. ∠BAF is greater than ∠BAC because the curved arrow goes beyond arm $\overrightarrow{AC}$ to reach the arm $\overrightarrow{AF}$.

Step 3. Thus ∠BAF is greater than a right angle.

Fig (iii)

Step 4. Hence ∠BAF is an obtuse angle.

An angle which is greater than right angle is called and obtuse angle.

EXERCISE 6.8

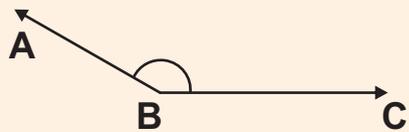
1. Look at the previous figures (i), (ii) and (iii) and complete the following sentences.

(i) ∠BAC is ______ angle. (ii) ∠BAD is ______ angle.
(iii) ∠BAF is ______ angle. (iv) ∠DAB is ______ angle.
(v) ∠FAB is ______ angle. (vi) ∠CAB is ______ angle.

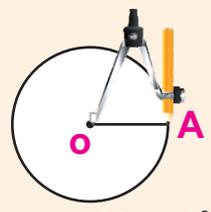
2. Draw the following angles.

(i) ∠ABC (obtuse angle)

A B C

(ii) ∠PQR (acute angle) (iii) ∠ABC (right angle)
(iv) ∠DEF (obtuse angle) (v) ∠WXY (right angle)

Recognize the standard unit for measuring angles as one degree (1°) which is defined as $\frac{1}{360}$ of a complete revolution

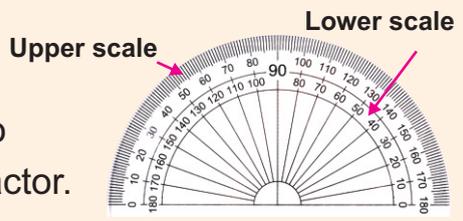
Define standard unit for measuring angle.

Step 1. Take O as centre and radius $\overline{OA}$, with a pair of compasses. Draw a complete revolution, it describes a circle.

Step 2. Divide this circle in 360 equal parts. Each equal part is called a degree. It is denoted by "1°".

Step 3. The number of degrees in a complete turn are 360°.

Step 4. A "degree" is $\frac{1}{360}$ th part of a complete revolution.

Measure angles using protractor

Protractor is used to measure angle from 0° to 180°. There are two scales of number marked on protractor.

The upper scale of protractor reads the measure of angle from left to right. The lower scale of protractor reads the measure of angle from right to left.

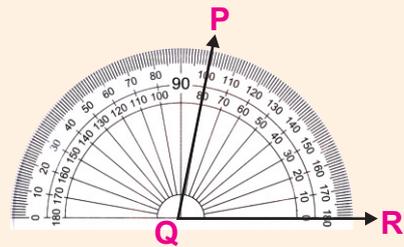
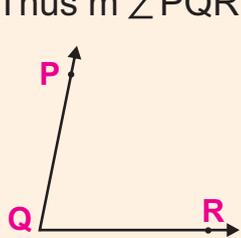
Measure the given acute angle ∠PQR

Step 1. Put the centre of the protractor on the vertex Q of ∠PQR.

Step 2. Base line coincides with one arm $\overrightarrow{QR}$.

Step 3. Start reading from 0° in lower scale from right to left.

Step 4. Mark at a point on which arm $\overrightarrow{QP}$ lies.

Step 5. Thus m ∠PQR = 80°

Measure the given obtuse angle ∠DEF.

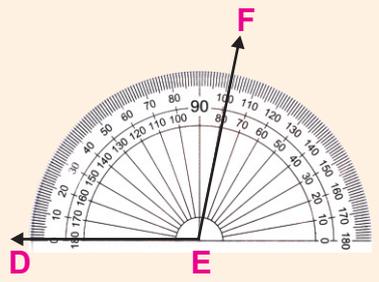
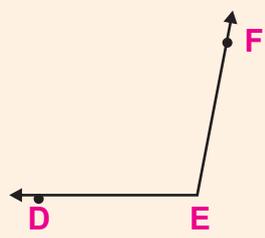
Step 1. Put the centre of the protractor on the vertex E of ∠DEF.

Step 2. The base line coincides with one arm $\overrightarrow{ED}$.

Step 3. Start reading from 0 in upper row from left to right.

Step 4. Mark at a point on which arm $\overrightarrow{EF}$ lies.

Step 5. The point F crosses the number 100.

Thus m ∠DEF = 100°.

EXERCISE 6.9

Using the protractor, measure the following angles.

(1)

(2)

(3)

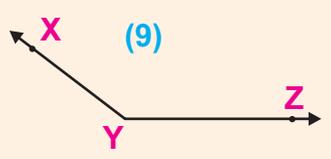
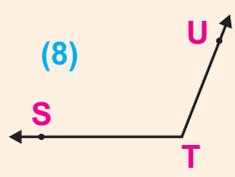
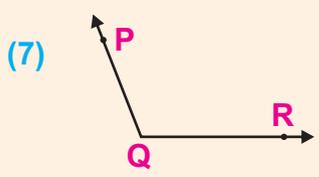
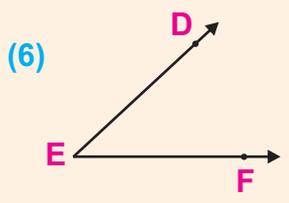
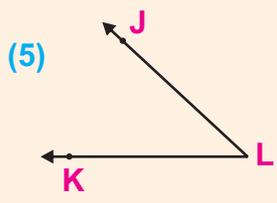
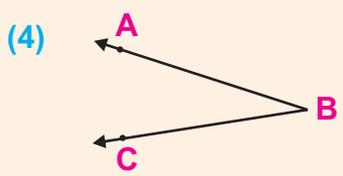
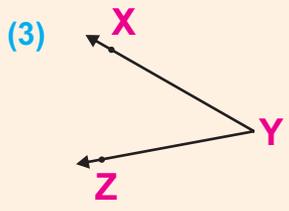
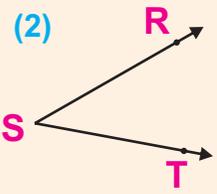
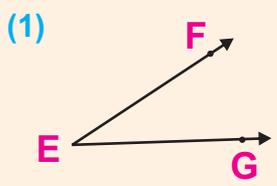
(4)

(5)

(6)

(7)

(8)

(9)

Draw a right angle using protractor

Activity **Draw an angle BAC of 90°.**

Fig (i)

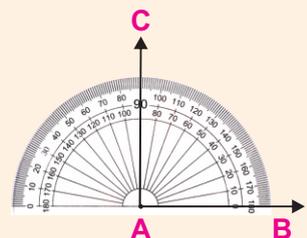
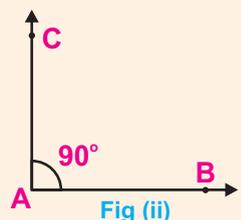
Step 1. Draw $\overrightarrow{AB}$ horizontally.

Step 2. Place protractor on $\overrightarrow{AB}$ such that the middle of its bottom line is exactly on A.

Step 3. Find the 90° mark on the protractor. Take a point against it, and name it C, fig (i).

Step 4. Join C to A.

Step 5. We get ∠BAC as shown in fig (ii).

Step 6. It is the required angle of 90° known as right angle.

C
90°
A B
Fig (ii)

Draw acute and obtuse angles of different measures using protractor

Activity 1 **Draw an acute angle of 60°.**

Step 1. Draw $\overrightarrow{OB}$.

Step 2. Place the centre of the protractor at point O, one end of $\overrightarrow{OB}$.

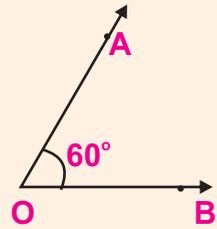
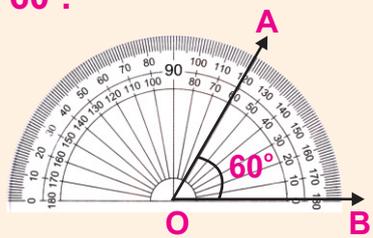
Step 3. Adjust the protractor so that the line of the 0 (zero) mark on the right side coincides with $\overrightarrow{OB}$.

Step 4. Extend $\overrightarrow{OB}$ if necessary.

Step 5. Make a fine point mark against the 60° mark on the protractor.

Step 6. Name this point A.

Step 7. Draw $\overrightarrow{OA}$ and extend it.

Step 8. AOB is the required acute angle measuring 60°.

Activity 2 Draw an obtuse angle of 130°.

Step 1. Draw a $\overrightarrow{YZ}$.

Step 2. We have to draw an angle of 130° at point Y.

Step 3. Place the centre of the protractor on the point Y.

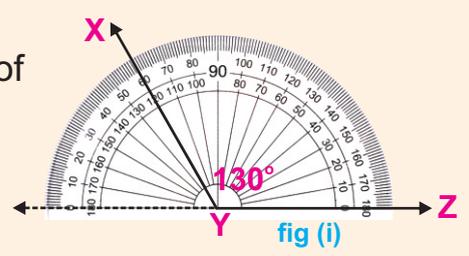



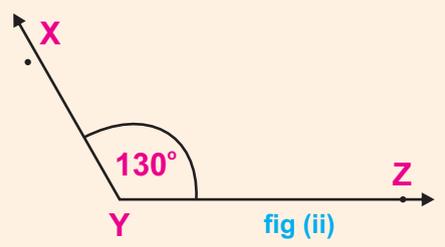
fig (i)

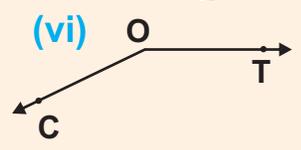
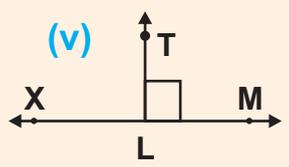
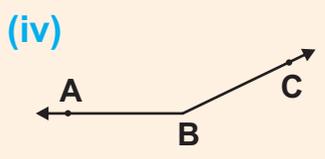
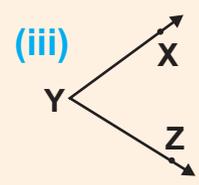
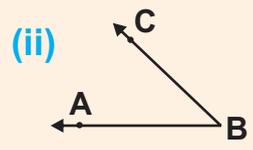
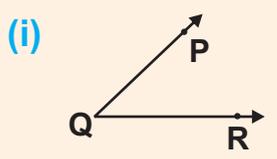
Step 4. Let 0 (zero) mark on the right side of the protractor be exactly on $\overrightarrow{YZ}$.(Extend $\overrightarrow{YZ}$ if necessary).

Step 5. Find 130° mark on the protractor. Take a point against it and call it X; see fig (i).

Step 6. Draw $\overrightarrow{YX}$ and extend it.

Thus ∠XYZ is the required angle of 130°, see fig (ii).

fig (ii)

EXERCISE 6.10

(1) Measure each of the following angles and then tell the type of the angle.

(2) Draw the following angles with the help of protractor.

(i)	10°	(ii)	40°	(iii)	20°	(iv)	60°	(v)	30°
(vi)	80°	(vii)	90°	(viii)	120°	(ix)	145°	(x)	45°

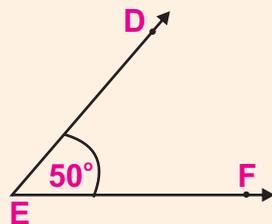
Draw an angle (using protractor)

We have already learnt to draw an angle of any measure with the help of protractor. Also we have learnt to measure any given angle with the help of protractor.

(a) Draw an angle equal in measure to a given angle.

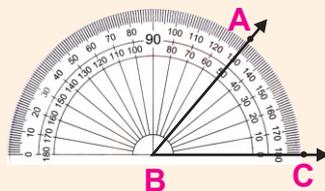
Steps of construction:

Step 1. Measure the given $\angle DEF$ with the help of protractor. It is found that $m\angle DEF = 50^\circ$.

D
50°
F
E

Step 2. We have to draw another angle say $\angle ABC$ such that

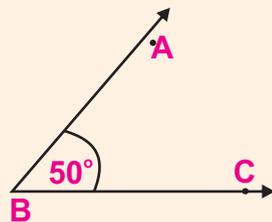
$m\angle ABC = m\angle DEF = 50^\circ$.

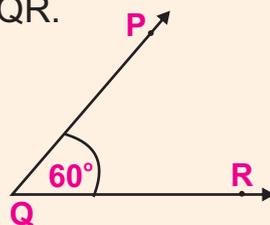
Step 3. Draw $\overrightarrow{BC}$ with initial point B.

Step 4. Place the centre of the protractor on B and adjust the base line of protractor to coincide with $\overrightarrow{BC}$.

Step 5. Start from zero and read the lower scale of the protractor up to 50°.

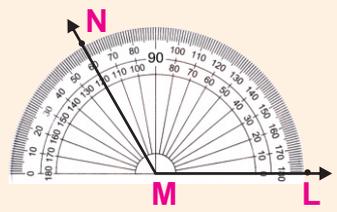
Step 6. Mark a point A against 50° mark.

Step 7. Remove the protractor and draw $\overrightarrow{BA}$.

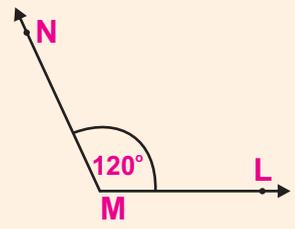
Thus $m\angle ABC = 50^\circ$. It is equal in measure to given $\angle DEF$.

(b) Draw an angle twice the measure of a given angle.

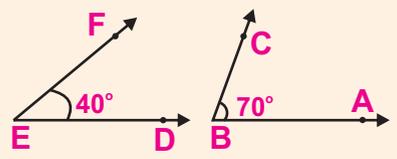
First of all we have to measure the given $\angle PQR$.
Let the measure of given angle is 60°.
Therefore we have to draw an angle of measure $2 \times 60^\circ = 120^\circ$
Say $m\angle LMN = 120^\circ$

Steps of construction:

Step 1. Draw $\overrightarrow{ML}$ with M as initial point.

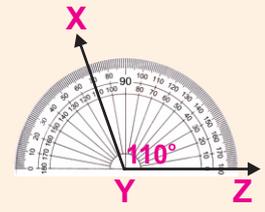
Step 2. Place the centre of the protractor on M and adjust the base line of protractor to coincide with $\overrightarrow{ML}$.

Step 3. Start from zero and read the lower scale on the protractor up to 120°.

Step 4. Mark a point N against 120° mark.

Step 5. Remove the protractor and draw $\overrightarrow{MN}$
Thus we get $\angle LMN$ such that
$m\angle LMN = 2 \times (m\angle PQR) = 120^\circ$

(c) Draw an angle equal in measure the sum of two angles.

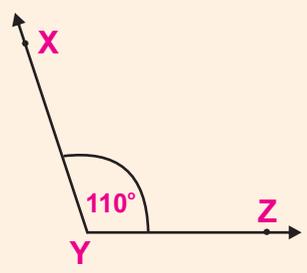
First of all we have to measure the given angles, $\angle ABC$ and $\angle DEF$ with the help of protractor.
Let $m\angle DEF = 40^\circ$ and $m\angle ABC = 70^\circ$
The sum of two given angles is $40^\circ + 70^\circ = 110^\circ$
Now we have to draw $\angle XYZ$ such that $m\angle XYZ = 110^\circ$

Steps of construction:

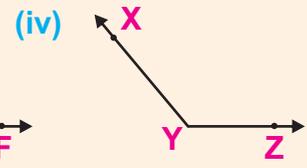
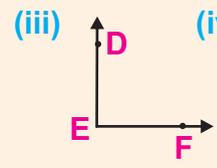
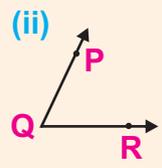
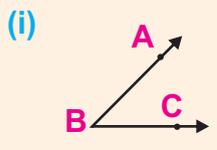
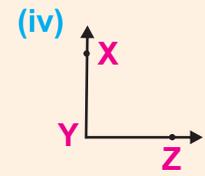
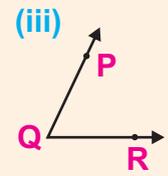
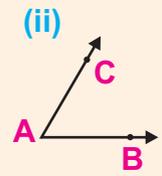
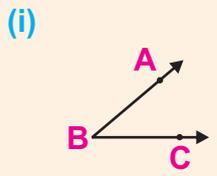
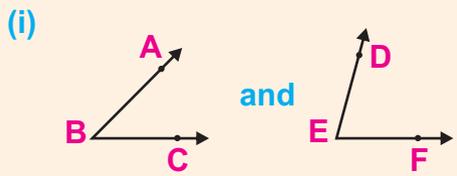
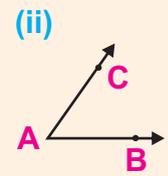
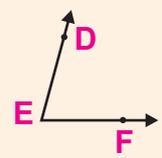
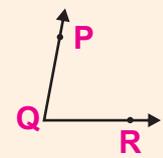
Step 1. Take an initial point Y and draw $\overrightarrow{YZ}$.

Step 2. Place the centre of the protractor on Y and adjust the base line of protractor to coincide with $\overrightarrow{YZ}$.

Step 3. Start from zero, read the lower scale of protractor up to 110°.

Step 4. Mark a point X against 110°.

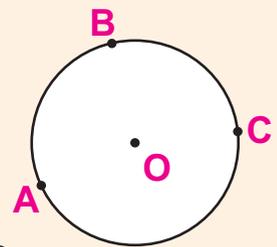
Step 5. Remove protractor and draw $\overrightarrow{YX}$.

Thus we get $\angle XYZ$ such that
$m\angle XYZ = m\angle DEF + m\angle ABC = 110^\circ$

EXERCISE 6.11

(1) Draw angles with the help of protractor equal in measure to the given angle.

(2) Draw angles with the help of protractor twice the measure of the given angle.

(3) Draw angles equal in measure to the sum of two angles. (with the help of protractor).

6.4 CIRCLE

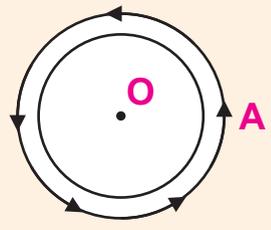
Look at the picture. It is the picture of a circle. There are three points A, B and C on the circle. Its centre is O. Points A, B and C are at the same distance from O.

Identify centre, radius, diameter and circumference of a circle

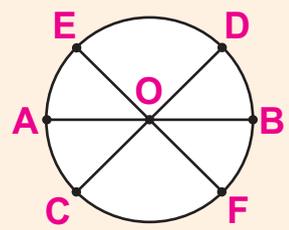
(i) Centre: All the points of a circle are at the same distance from a fixed point O, called its centre.

Example:

Point A, B and C are at the same distance from centre O.

B C O A

(ii) Circumference: The length of the circle is called the **circumference** of the circle. It is the distance that we cover by taking exactly one complete round of the circle.

Example:

Lets start at point A and again reach the same point A after completing one revolution. This distance is the circumference of circle.

(iii) Diameter: The line segment passing through the centre of the circle and touching the circle at two points is called the **diameter**.

Example:

$\overline{AB}$, $\overline{CD}$, $\overline{EF}$ etc are the diameters.

(iv) Radius: Radius is half of the diameter of a circle.

Remember: $\text{Radius} = \dfrac{\text{Diameter}}{2}$

Draw a circle of given radius using compasses and straightedge/ruler

Draw a circle using compass whose radius is 2 cm.

Fig (i)

Step 1. Draw $\overline{OA}$, 2 cm long.

Step 2. Take O as centre and radius $\overline{OA}$, draw arc of one complete revolution. [it is shown in the fig (i)]

Step 3. This is the required circle of radius 2 cm. [fig(ii)]

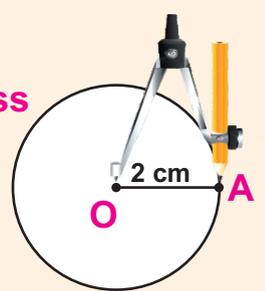
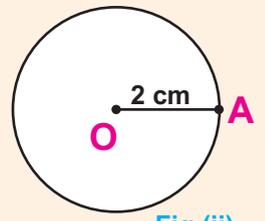



Fig (ii)

Teacher's Note

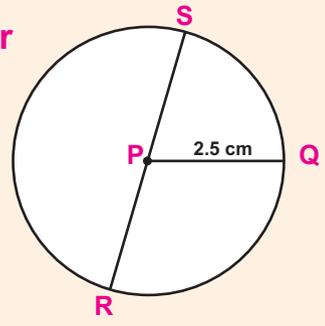
Teacher may draw circle on black board and explain all these terms involving with students.

Draw a circle using ruler whose radius is 2.5 cm.

$m\overline{PQ}$ = radius = 2.5 cm

$m\overline{PQ}$ = 2.5 cm

$m\overline{SR}$ = diameter = twice the radius

= 2 x 2.5 = 5.0 cm = 5 cm

EXERCISE 6.12

By using compass and ruler draw the following circles if their radii are:

(1)	3.2 cm	(2)	4.1 cm	(3)	4.4 cm
(4)	5.5 cm	(5)	6 cm	(6)	4.8 cm

6.5 QUADRILATERALS

Construct squares and rectangles with sides of given measure using protractor, set squares and straightedge/ruler.

Draw a square with side 4 cm using set square.

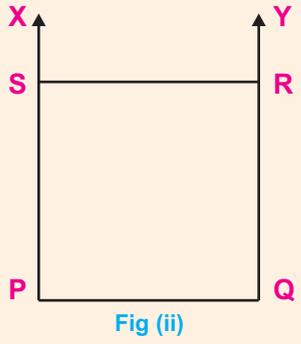
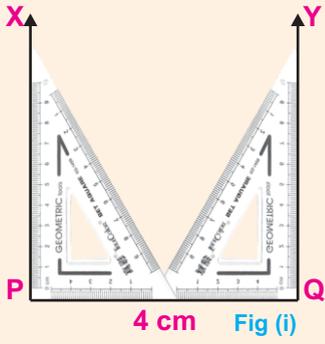



Fig (i)

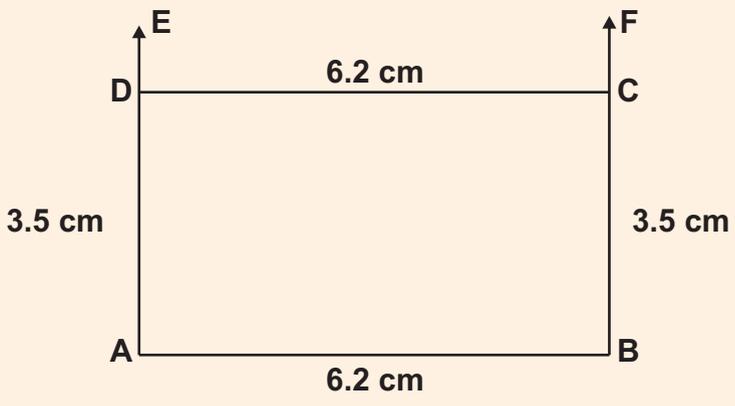
Fig (ii)

Steps of construction:

Step 1. Draw $\overline{PQ}$, 4 cm long.

Step 2. At points P and Q, draw right angles $\angle QPX$ and $\angle PQY$ using set square. [see fig (i)]

Step 3. From $\overrightarrow{PX}$, measure $\overline{PS}$ = 4 cm and from $\overrightarrow{QY}$, measure $\overline{QR}$ = 4 cm. Join R and S. So, PQRS is the required square [see fig (ii)].

To draw a rectangle with sides 6.2 cm and 3.5 cm using protractor and ruler.

Step 1. Draw $\overline{AB}$, 6.2 cm long.

Step 2. At points A and B draw right angles ∠BAE and ∠ABF using protractor.

Step 3. From $\overrightarrow{AE}$, measure $\overline{AD}$ = 3.5 cm and from $\overrightarrow{BF}$, measure $\overline{BC}$ = 3.5 cm.

Step 4. Join C and D. So, ABCD is the required rectangle.

EXERCISE 6.13

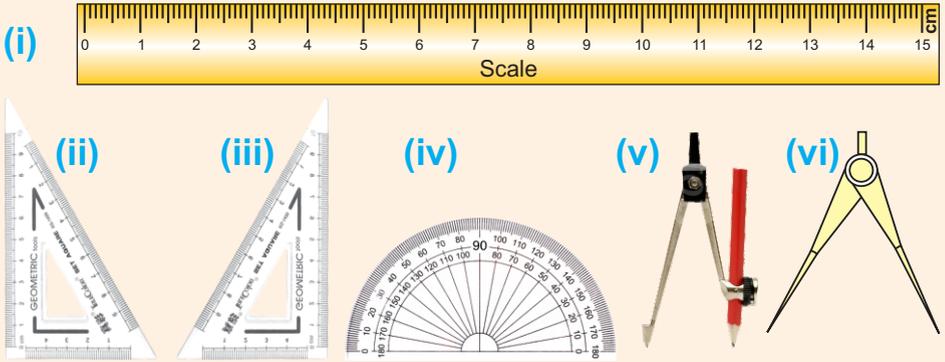
1. Draw squares with sides of the following lengths. Using protractor or set square.

(i)	6.5 cm	(ii)	4.9 cm	(iii)	5.8 cm	(iv)	6.3 cm
(v)	7.3 cm	(vi)	4.1 cm	(vii)	8.7 cm	(viii)	8.5 cm

2. Draw rectangle with sides of the following lengths using protractor or set square.

(i)	8 cm and 7 cm	(ii)	9.5 cm and 4.7 cm
(iii)	12.3 cm and 5.2 cm	(iv)	9.6 cm and 3.7 cm
(v)	6.1 cm and 2.9 cm	(vi)	2.9 cm and 7.6 cm

REVIEW EXERCISE

1. Write down the names of the following instruments.

2. If you have to draw a thin line segment, which grade of pencil you will use.

3. Measure the length and width of the following objects with ruler in millimetres.

   (i) A post card (ii) Cover of Maths-book

   (iii) Geometry Box

4. Draw a pair of :

   (a) Parallel and non-parallel lines.

   (b) Horizontal and vertical lines.

5. Draw a curved line and measure its length by using thread and ruler.

6. Draw line which passes through a given point and is parallel to a given line using set square.

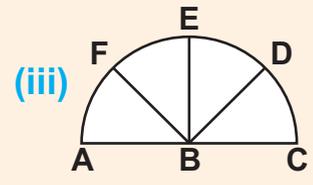
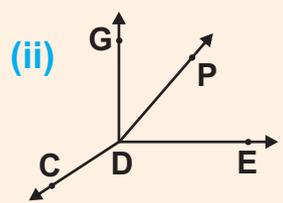
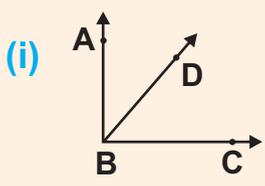
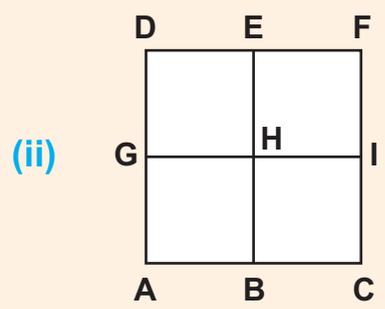
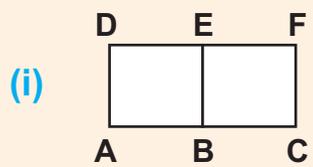
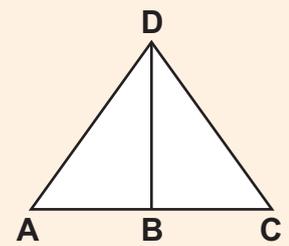
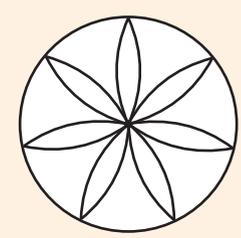
7. Draw the figure to go with each sentence:

   (i) $\overleftrightarrow{PQ}$ is parallel to $\overleftrightarrow{RS}$.

   (ii) $\overleftrightarrow{UV}$ intersects $\overleftrightarrow{PQ}$ at point A.

   (iii) $\overleftrightarrow{UV}$ intersects $\overleftrightarrow{RS}$ at point B.

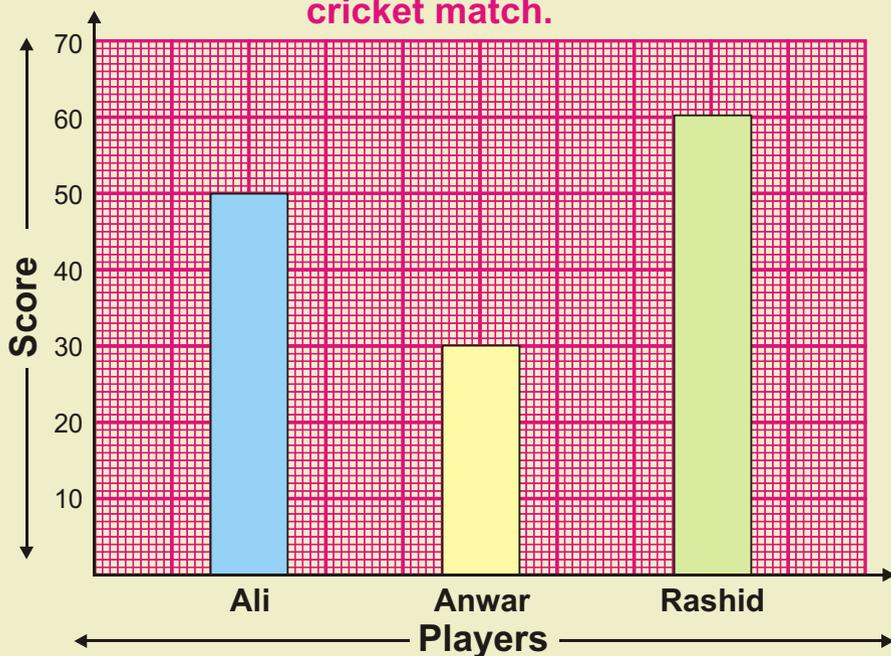
8. List some objects in your class room that represent right angles.

9. How many angles can you find in the figure?
Name and mention the type of the angle.

10. Count the number of squares in the figure. Also name them.

11. How many triangles in the figure?

12. Get a compass and practice drawing same circles. Make Some designs of your own.

13. (i) Draw a circle with 25 mm radius.
(ii) Name its centre, radius, diameter and circumference.
(iii) Measure its circumference with thread and ruler.

7.1 BAR GRAPH.

Read and interpret simple bar graphs given in horizontal and vertical form.

In bar graph we draw rectangular strips, horizontally or vertically with equal spacing between them. Each bar represents only one quantity.

Following is the picture of a bar graph showing the score of three players in a cricket match.

From the above bar graph. We can understand the following.

The number of runs made by Ali are ___**50**___.

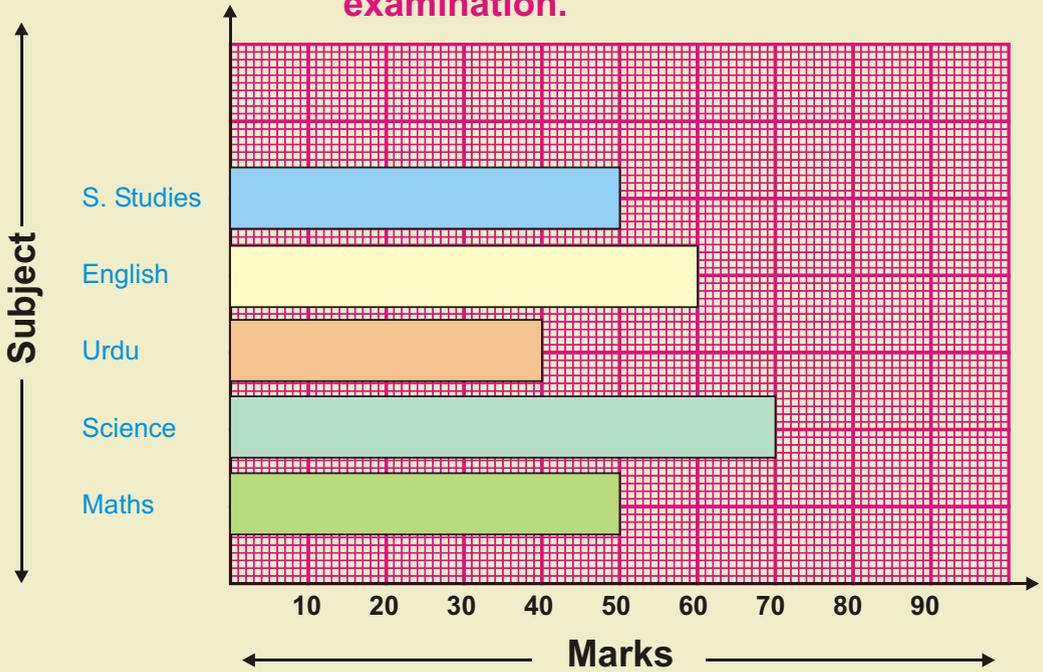
The number of runs made by Anwar are ____________.

The number of runs made by Rashid ____________.

Whose runs are the highest ______________?

Whose runs are the least______________?

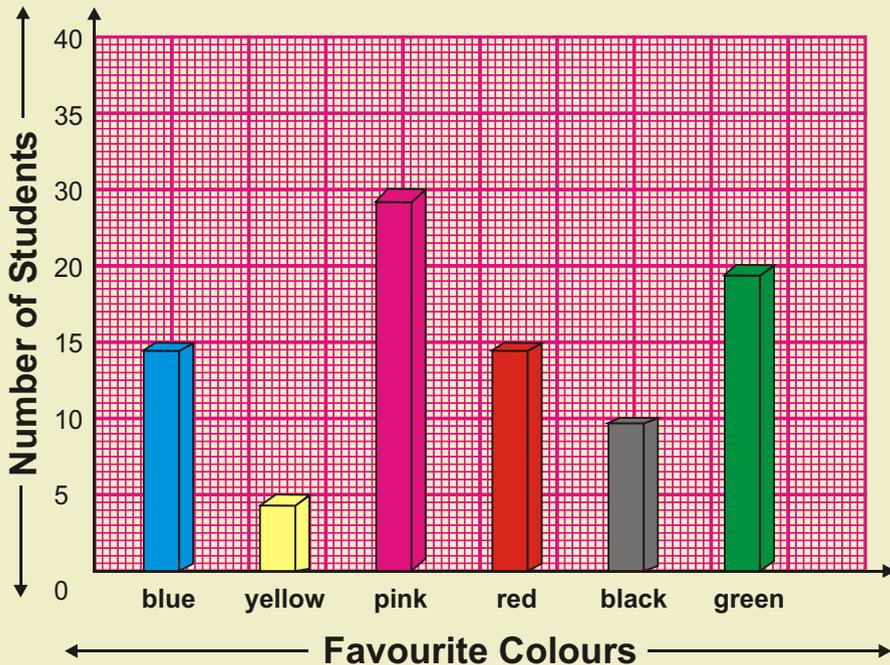
Activity

Read the bar graph showing the marks secured by Saima in her final examination.

Fill in the following boxes:

1. She secured highest marks in: **Science**
2. She secured lowest marks in:
3. In how many subjects she appeared?
4. In how many subjects she secured equal marks?
5. In which subject she secured more than 60 marks?
6. What was the total marks of Saima?

EXERCISE 7.1

1 Look at this Bar graph.

Survey of favourite colours of students of class IV

Answer the following questions:

(i) How many students like yellow colour?

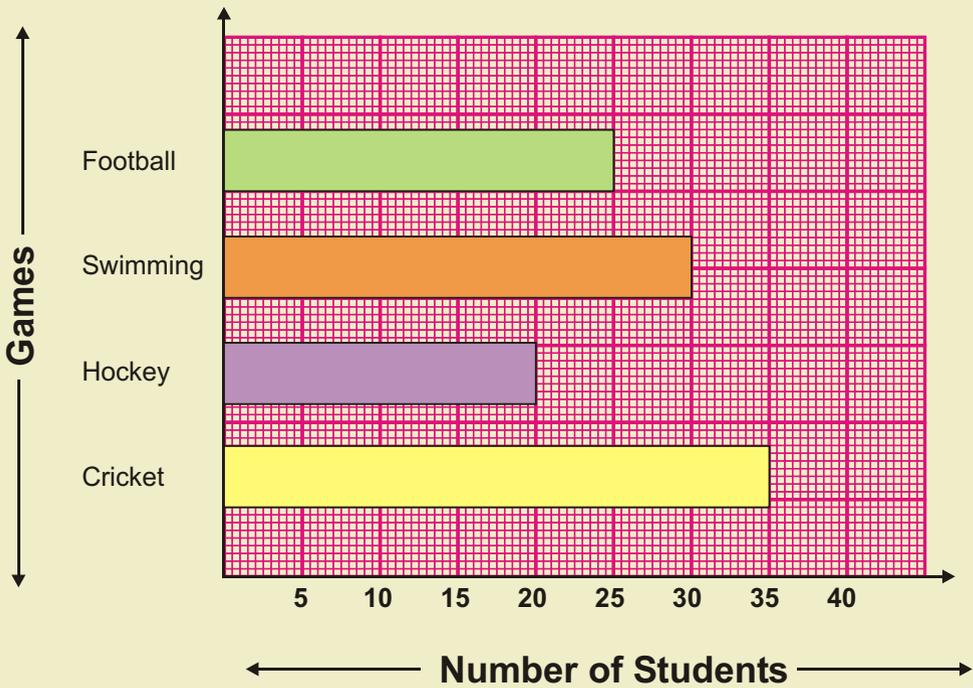
(ii) Which colour is liked most?

(iii) Which colour is liked least?

(iv) How many students like green colour?

(v) How many students like red colour?

(vi) How many colours are included in this survey?

(vii) How many students included in this survey?

(i) How many students like Hockey?

(ii) Which game is liked most?

(iii) How many students like Football?

(iv) How many games liked by students?

(v) Which game is liked least?

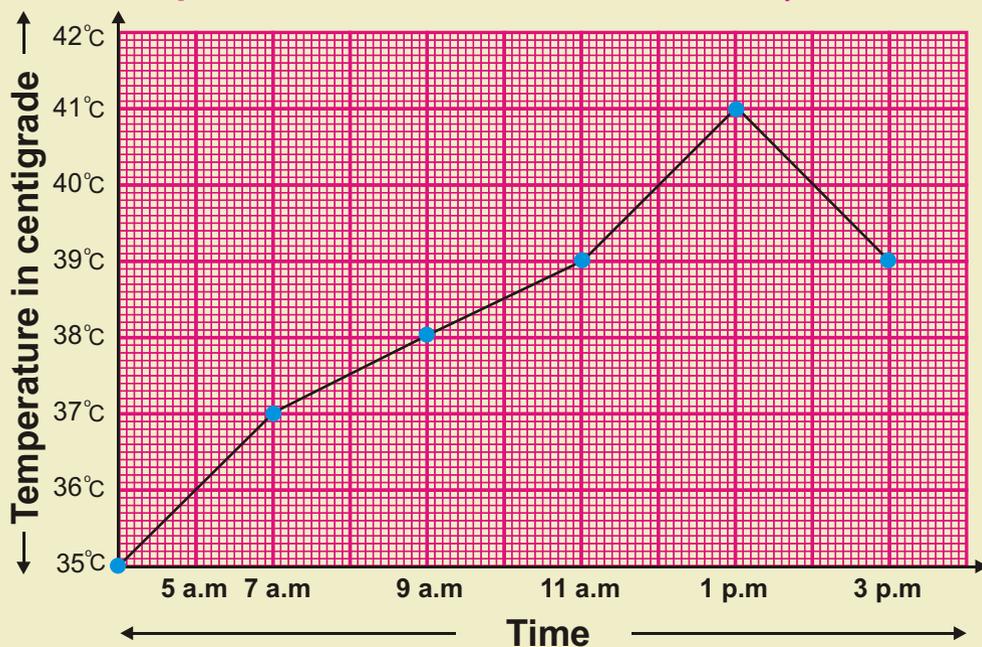
(vi) How many students like cricket?

(vii) How many total students involved in games?

7.2 LINE GRAPH:

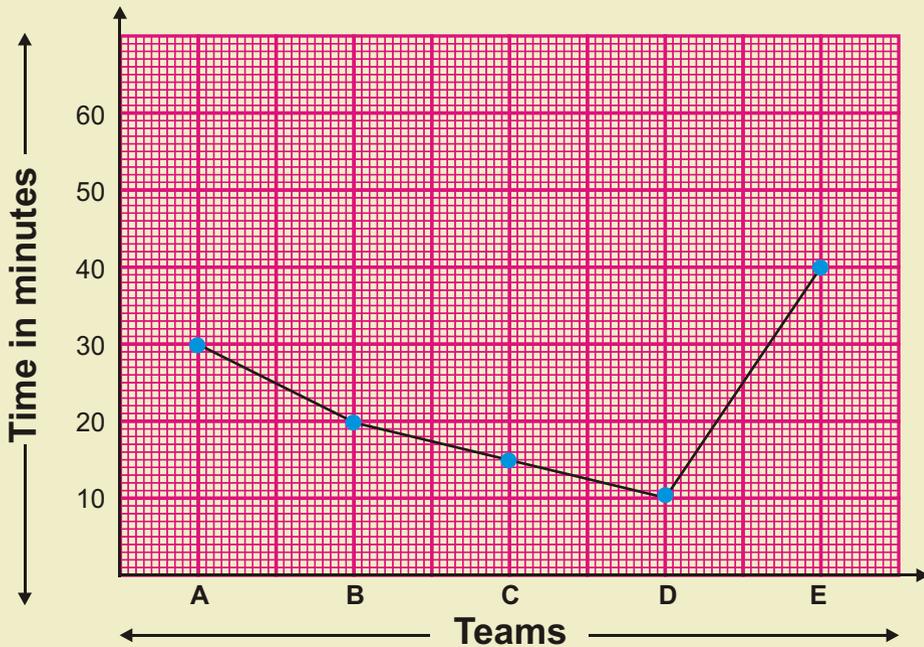
Read and interpret line graph

In line graph the information is represented in the form of points. These points are joined together by line segments.

Activity **Following is a line graph representing temperature of Jacobabad town at various time of the day. (Time is on horizontal axis and temperature is shown on vertical axis).**

Look at the graph and answer the following questions.

1	What was the temperature at 9 a.m.?	38°C
2	At what time the temperature was the lowest?	
3	Were the temperatures same at 7 a.m. and 3 p.m.?	
4	What was the temperature at 1 p.m.?	
5	What was the lowest temperature?	

EXERCISE 7.2

1. This line graph shows the time in minutes taken by each of the five teams to complete a task.

Now answer these questions.

(i) Which team completed the work in the shortest time?

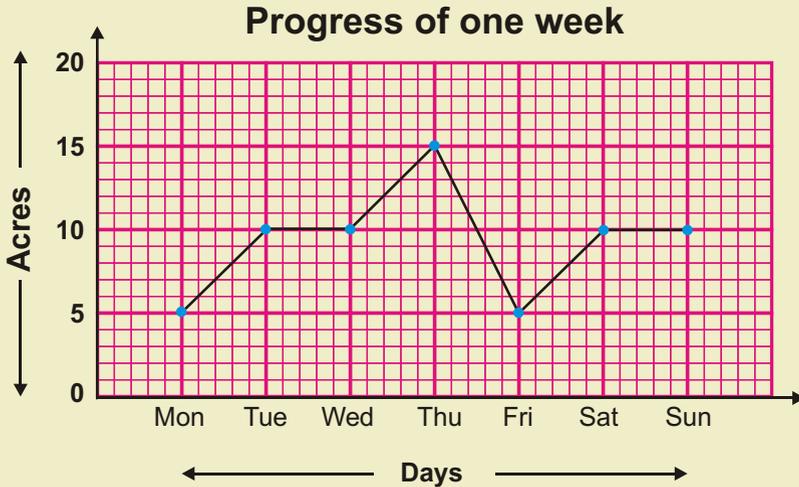
(ii) Which team took the longest time?

(iii) Which teams took the same length of time?

(iv) What was the shortest time?

(v) What was the longest time?

(vi) How long did team C take to complete the task?

2 A farmer took a tractor on rent to plough his fields. The progress of one week is shown by the following graph. Names of days are shown on horizontal axis and acres on vertical axis.

Look at the graph and answer the following questions:

(i) On which day the tractor ploughed the maximum number of acres?

(ii) How many acres of land were ploughed on Wednesday?

(iii) For how many days the land was ploughed?

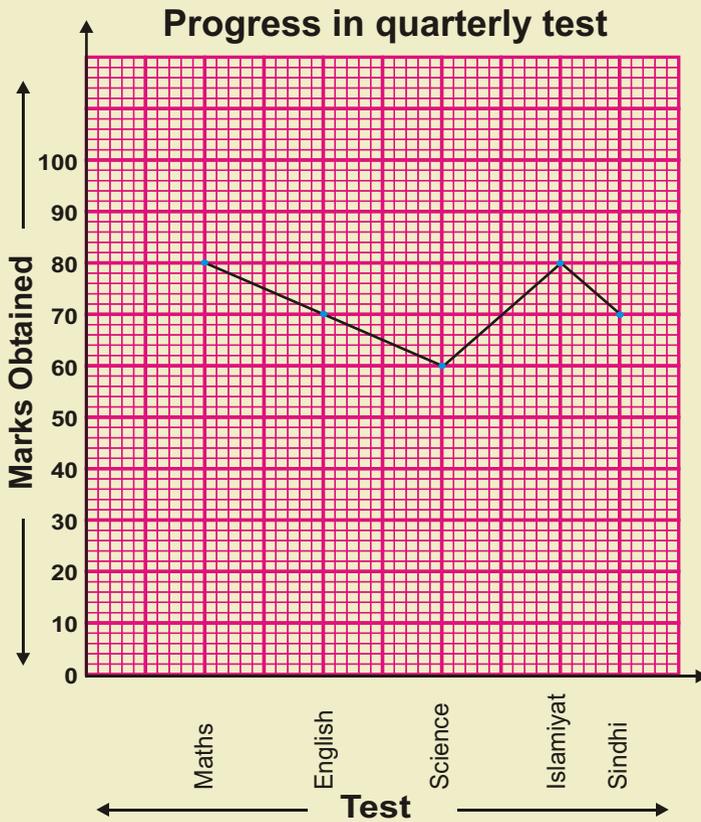
(iv) What was his progress on Tuesday?

(v) On which days the progress was minimum?

(vi) How many acres of fields were ploughed during the whole week?

(vii) Give the separate output for Thursday, Friday and Saturday?

(viii) On which days the output was same?

3. Samina's progress in quarterly tests is shown in the graph. The names of subjects are shown on horizontal axis. The number of marks are shown on vertical axis.

Look at the graph and answer the following questions:

(i) In which subject Samina secured the highest marks?

(ii) What were her total marks obtained?

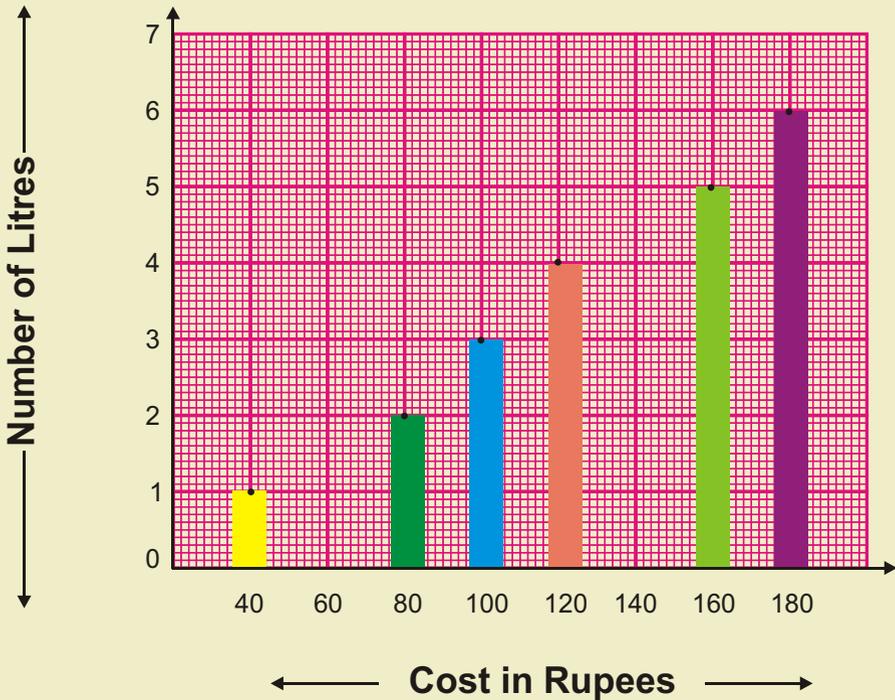
(iii) How many marks did she get in English?

(iv) How many marks did she get in Maths?

(v) In which subject did she get the lowest marks?

(vi) How many marks did she get in Sindhi?

REVIEW EXERCISE

(1) The given bar graph shows the cost of mango squash.

Study the graph and answer these questions.

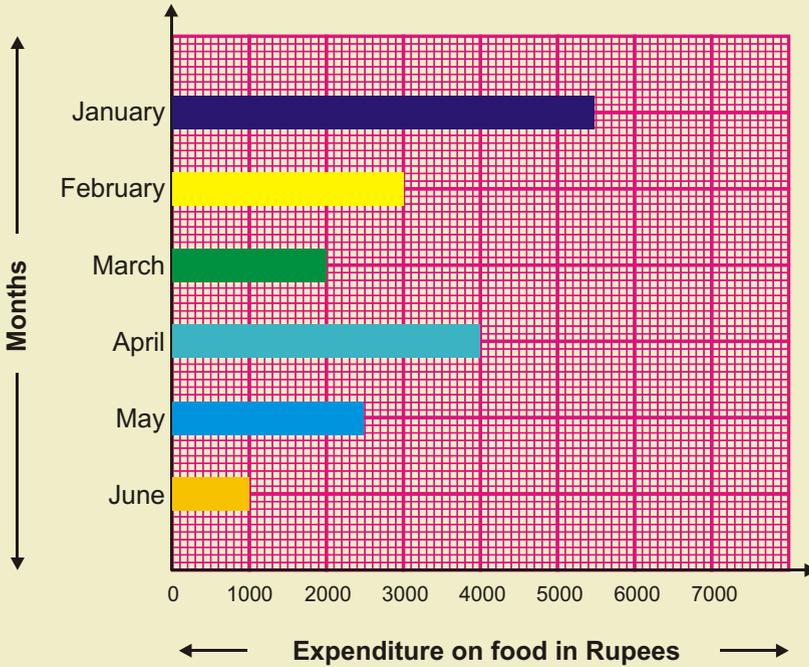
(i) What is the cost of 2 litres of mango squash?

(ii) What is the cost of 4 litres of mango squash?

(iii) If we have six notes of Rs 20, can we buy 6 litres of mango squash?

(iv) How much change, we will have from Rs 100, when we buy 2 litres of mango squash?

(v) How much litres of squash can we buy from Rs 180

(2) **Read the following bar graph of Rashid's family about the expenditure on food for six months.**

Look at the graph and answer the following questions.

(i) How much amount is spent on food during the month of February?

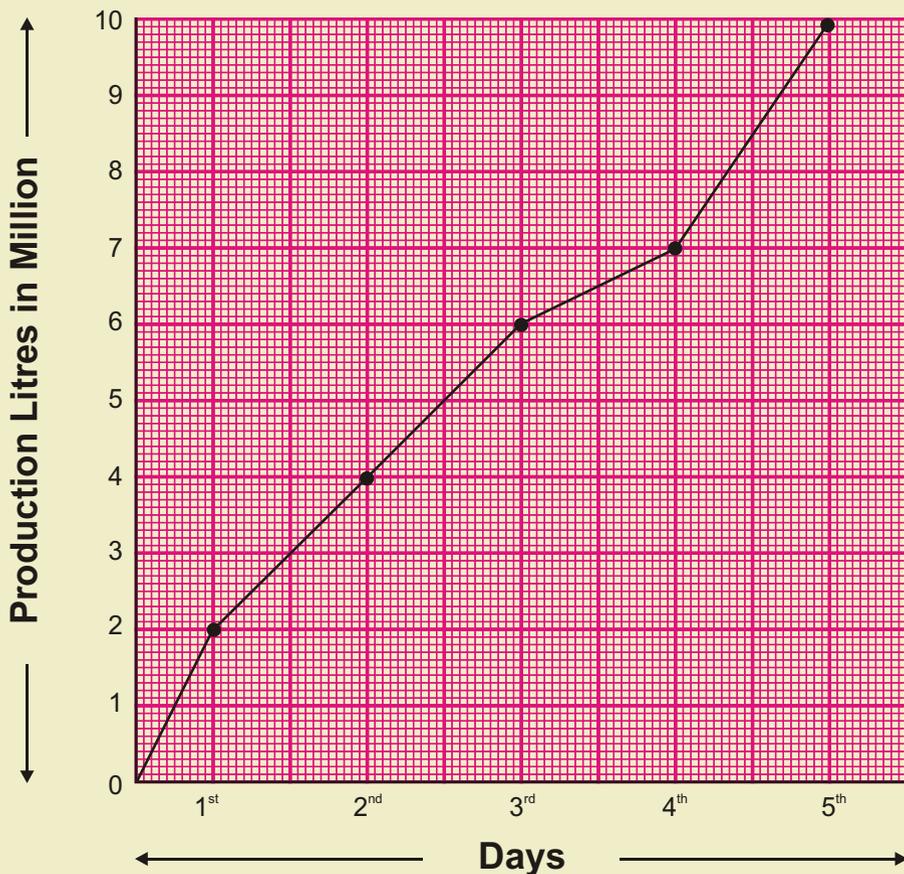
(ii) How much amount is spent on food during month of April?

(iii) In which month the expenditure spent was the lowest?

(iv) In which month the expenditure spent was the highest?

(v) What are the total expenditures spent from January to June?

(vi) What was the difference in expenditure spent for April and May.

(3) The line graph shows the production of a oil plant over a period of 5 days.

Look at the line graph and answer these questions.

(i) What is the production of the plant on the 1st day?

(ii) What was its production on the 3rd day?

(iii) How much production was made between the 2nd and 3rd days?

(iv) How much production was made between the 2nd and 5th days?

(v) On which days did the plant growth production was the highest?

(vi) How many times the plant production was measured?

GLOSSARY

Addition: Symbol +; the process of finding sum of two numbers/quantities.

Associative property addition: The property that when any three numbers (fractions) are added in any order, their sum is always the same.

Associative property multiplication: The property when any three numbers (fractions) are multiplied in any order, their product is always the same.

Angle: The amount of turning between two arms about a common point.

Arc: A part of a circle.

Acute angle: An angle which is less than 90°.

Acute angle triangle: A triangle which has one of its angle acute angle.

Capacity: The amount of liquid a container can hold.

Centimetre: A unit of length, 100 centimetres (cm) = 1 metre (m)

Circle: A plane shape bounded by a single curved line where all of its points are at equal distance from a fixed point.

Commutative property of Multiplication: The property that any two numbers (fractions) when multiplied to each other in any order, their product is always same.

Commutative property of addition: The property that when any two numbers (fractions) are added in any order their sum is always same.

Common multiples: The numbers which are common in multiples of two or more numbers.

Composite numbers: A number which has more than two factors is prime numbers.

Division: Process of finding quotient of two number/quantities. (The repeated subtraction).

Denominator: Lower number of the common fraction.

Diametre: A half circle's line segment is called diametre of the circle Diametre .

GLOSSARY

Divisibility:	A division in which when a number is divided by another, the remainder is zero.
Dividend:	A number is to be divided by another number, till we get less number than the divisor.
Divisor:	A number which can divide the other number exactly.
Decimal fraction:	A common fraction with a denominator as 10,000, written with a decimal point.
Even numbers:	The numbers having 0,2,4,6,8 at their units place.
Edge:	A one dimensional line segment joining two vertices.
Equivalent fraction:	The fractions that have the same value.
Fraction:	Part of a whole.
Factors:	The divisors of a number.
Factorization:	A number represented as a product of its factors.
Gram:	Unit of mass.
Graph:	A pictorial representation of data.
GCD:	Greater Common Divisor.
Hours:	24^{th} part of the day, 60 minutes. A unit of time **1 hour = 60 minutes**
HCF:	Highest Common Factor.
Improper fraction:	A fraction whose numerator is greater than the denominator.
Kilogram:	A unit of mass. 1 kilogram (kg) = 1000 grams (g)
Litre:	Unit of volume/capacity 1 litre (ℓ) = 1000 millilitres ($m\ell$)
Line segment:	Shortest distance between two points. A B
Line:	A B This figure represents a line AB.

Lunar Calendar: (Hijrah Qamri Calendar) Islamic Calendar in a solar year.

L.C.M Least Common Multiple.

Like fractions: Fractions having same denominator.

Multiplication: The process of finding product of two numbers/quantities (Repeated Addition).

Mass: Quantity of matter present in a body.

Millilitre: Thousandth part of a litre.

Millimetre: Thousandths part of a metre.

Minute: Sixtieth part of an hour. **1 minute = 60 seconds**

Month: A unit of time. **1 month = 30 days**

Million: The smallest seven digit number i.e. 1,000,000 (Ten hundred thousand)

Mixed fraction: A fraction contains both a whole number and a proper common fraction.

Numerator: Upper number of common fraction.

Obtuse angle: An angle which is more than 90°.

Obtuse angled triangle: A triangle which has one of its angles obtuse angle.

Place value: Value of a digit of a number according to its place.

Proper fraction: A fraction whose numerator is less than the denominator.

Paisa: Unit of Pakistani currency.

Point: A small dot used for location of a place on any surface.

Prime factorization: A factorization in which every factor is a prime factor.

Protector: An instrument used for measuring angles.

Quadrilateral: A four sided closed figure.

Quotient: The number shows how many times the divisor has been repeatedly subtracted.

Remainder: The number left over when one integer is divided by another.

Ray: An arrow mark on one end point of a line segment

A Ray AB B

Rectangle: A quadrilateral whose opposite sides are equal and have four right angles.

Radius: The distance from the centre of the circle to the boundary of the circle.

Rupee: Unit of Pakistani currency.

Ruler: A straight edge used to measure distances.

Right angle: An angle whose measure is 90°.

Right triangle: A triangle which has one of its angle of the measure 90°.

Symbol: A sign used to represent an operation, element or relation.

Square: A quadrilateral whose all four sides are equal and has four right angles.

Subtraction: Symbol (–). The process of finding the difference between two numbers/quantities.

Second: Unit of time, $\frac{1}{60}$ the part of a minute.

Solar Calendar: In this calendar, the dates indicates the position of earth around the sun (365 days in a year).

Scalere triangle: A triangle whose all sides are of different measures.

Triangle: A three sided closed figure.

Unlike fractions: Fractions whose denominators are not same.

Unit fraction: Numerator is equal to the denominator.

Vertex: An angular point of any shape.

Week: A unit of time. **1 week = 7 days**

Year: A unit of time. **1 year = 365 days**

ANSWERS

EXERCISE 1.1

(1) (i) 4,692 (ii) 69,407 (iii) 456,926 (iv) 700,000

(v) 902,042 (vi) 729,006

(2) (i) Two thousand five hundred sixty one

(ii) Thirty four thousand five hundred sixty one

(iii) Fifty six thousand eighty one (iv) Ninety two thousand

(v) Two hundred forty five thousand six hundred twelve

(vi) Three hundred forty nine thousand six hundred fifty only

EXERCISE 1.2

(1) (i) The place value of 2 is 2 million = 2,000,000

(ii) The place value of 8 is 8 million = 8,000,000

(iii) The place value of 1 is 1 hundred million = 100,000,000

(iv) The place value of 9 is 9 hundred thousand = 900,000

(v) 5 million = 5,000,000,
2 hundred = 200

(vi) 9 million = 9,00,000,
1 thousand = 1000

(vii) 9 hundred thousand = 900,000,
8 thousand = 8000

(viii) 7 ten million = 70,000,000,
6 million = 6,000,000

(2) (i) 9 millions = 9,000,000
2 hundred thousands = 200,000
3 ten thousands = 30,000
4 thousands = 4,000
5 hundreds = 500
1 ten = 10
3 ones = 3

(ii) 5 ten millions = 50,000,000
0 millions = 0,000,000
1 hundred thousands = 100,000
2 ten thousands = 20,000
0 thousand = 0,000
3 tens = 30
6 ones = 6

(iii) 3 millions = 3,000,000
5 hundred thousands = 500,000
6 ten thousands = 60,000
7 thousands = 7,000
8 hundreds = 800
9 tens = 90
9 ones = 9

(iv) 3 ten millions = 30,00,00
6 millions = 6,000,000
5 hundred thousands = 500,000
6 ten thousands = 60,000
4 thousands = 4000
3 hundreds = 300
9 tens 90
6 ones = 6

EXERCISE 1.3

1. (i) Two hundred forty one thousand nine hundred thirty five only.
   (ii) Four million three hundred twelve thousand six hundred eighty seven.
   (iii) Five million.
   (iv) Twenty five million one hundred thirty four thousand five hundred sixty four.
   (v) One hundred million.
   (vi) Nine million two hundred sixty four thousand three hundred eighty seven.
   (vii) Fifty millions one thousand.
   (viii) Four million one hundred nine thousand two hundred.
   (ix) Ninety nine million nine hundred ninety thousand ninety.

2. (i) 2,900,068 (ii) 30,600,045 (iii) 100,000,000
   (iv) 20,000,020 (v) 90,067,000

4. (i) 2,453,761, 2,454,761, 2,455,761
   (ii) 7,000,600, 7,000,700, 7,000,800
   (iii) 67,243,415, 67,253,415, 67,263,415

5.

Millions	Ten Millions	Hundred Millions
2,456,178	22,233,341	100,000,000
1,000,000	10,000,000	
2,561,000	20,001,010	

EXERCISE 1.4

1. (i) < (ii) > (iii) < (iv) > (v) >

2. (i) **Ascending Order:**
   3,076,005, 3,174,215, 3,741,512
   Descending Order:
   3,741,512, 3,174,215, 3,076,005
   (ii) **Ascending Order:**
   95,113,417, 95,123,415, 95,312,415
   Descending Order:
   95,312,415, 95,123,415, 95,113,417
   (iii) **Ascending Order:**
   52,111,222, 58,110,176, 59,178,215, 59,296712
   Descending Order:
   59,296,712, 59,178,215, 58,110,176,52,111,222

(iv) **Ascending Order:**
13,100,219, 13,200,415, 14,111,920, 14,160,000

Descending Order:
14,160,000, 14,111,920, 13,200,415, 13,100,219

EXERCISE 1.5

1. (i) 66676 (ii) 142523 (iii) 405253 (iv) 551177
   (v) 1393289 (vi) 1311571
2. (i) 114552 (ii) 317981 (iii) 1114946 (iv) 1533612
   (v) 1138719 (vi) 1334462 (vii) 1158121 (viii) 1791275

EXERCISE 1.6

1. Rs 928117
2. 37842 students
3. Rs 1498800
4. 98682 people
5. 1590330 bicycles
6. 796310 Mangoes

EXERCISE 1.7

1. (i) 12111 (ii) 562051 (iii) 111620 (iv) 608819
   (v) 161547 (vi) 46952
2. (i) 55555 (ii) 234122 (iii) 1 (iv) 162136
   (v) 188750 (vi) 30283 (vii) 90100 (viii) 100000
   (ix) 999 (x) 581110 (xi) 37908 (xii) 449008

EXERCISE 1.8

1. Rs 445550
2. 14001 students
3. Rs 272920
4. Rs 180002
5. 112 people
6. 46240 hens

EXERCISE 1.9

1. (i) 376992 (ii) 7206421 (iii) 4911728 (iv) 7561278
   (v) 28880618 (vi) 31791975 (vii) 20578868 (viii) 12087428
2. (i) 1168900 (ii) 2579880 (iii) 14212653 (iv) 4886040
   (v) 8338834 (vi) 1518435 (vii) 17437041 (viii) 35974913

EXERCISE 1.10

1.	702768 bottles	2.	Rs 756000	3.	Rs 11635000
4.	17316000 eggs	5.	40083820 litres	6.	Rs 9268400

EXERCISE 1.11

(1) (i) 562 (ii) 253 (iii) 561 (iv) 782
(v) 123 (vi) 452

(2) (i) Quotient = 156 (ii) Quotient = 254 (iii) Quotient = 158
(iv) Quotient = 252 (v) Quotient = 245 (vi) Quotient = 369

(3) Quotient = 145, Remainder = 0 (4) Quotient = 356, Remainder = 0

(5) Quotient = 2586, Remainder = 3 (6) Quotient = 617, Remainder = 12

EXERCISE 1.12

(1)	Rs 123	(2)	896 suits	(3)	Rs 586
(4)	156 crates	(5)	Rs 225	(6)	281 kg

EXERCISE 1.13

(1)	40	(2)	55	(3)	76	(4)	58
(5)	354	(6)	411	(7)	852	(8)	490
(9)	115	(10)	288	(11)	248	(12)	175
(13)	82	(14)	103	(15)	823	(16)	10358

EXERCISE 1.14

(1) Rs 1378640 (2) Rs 205501 (3) 498040 chicken
(4) Rs 14310000 (5) 47028035 trees (6) Rs 125 (7) 14 apples

REVIEW EXERCISE 1

(1) (i) c (ii) b (iii) d

(2) (i) Two million four hundred twelve thousand three hundred sixteen
(ii) Thirty six million one hundred twenty three thousand one hundred one
(iii) Six hundred thousand two hundred sixteen

(3) (i) 20,000,000 (ii) 100,000,000

ANSWERS

(4) (i) 1128857 (ii) 1712258

(5) (i) 749007 (ii) 100091 (iii) 167778

(6) (i) 15984423 (ii) 2590560 (iii) 254 (iv) 159 (v) 74

(7) The amount left with Raheel = Rs 54560

EXERCISE 2.1

(1) (i), (ii) and (v) **(2)** (i), (ii) and (iv) **(3)** (iii) and (v)

(4) (i), (ii) and (iv) **(5)** (i), (iii) and (v) **(6)** (iii) and (iv)

EXERCISE 2.2

(1) (ii) , (v) **(2)** (i) , (v) , (viii) , (ix) and (x)

(3) **Prime Numbers:** 41, 43, 47, 53, 59. Remaining are composite.

(4) 2, 3, 5, 7, 11, 13, 17, 19

(5) 12, 14, 15, 16, 18, 20, 21, 22, 24, 25, 26, 27, 28

(6) **Prime Numbers:** 23, 29, 31, 37

EXERCISE 2.3

(1) **Multiples of 4 are:** 4, 8, 12, 16, 20, 24, 28, 32, 36, 40, 44, 48

Multiples of 7 are: 7, 14, 21, 28, 35, 42, 49, 56, 63, 70, 77, 84

Multiples of 9 are: 9, 18, 27, 36, 45, 54, 63, 72, 81, 90, 99, 108

(2) **Factors of 16 are:** 1, 2, 4, 8, 16 **Factors of 26 are:** 1, 2, 12, 26

Factors of 45 are: 1, 3, 5, 9, 15, 45

(3) 14, 28, 35, 56, 84 **(4)** 24, 32, 40, 48, 56, 64, 72, 80, 88

(5) Factors of 50 are: 1,5,10,25,50

EXERCISE 2.4

(1) (i) 1, 2, 3, 4, 6, 12 (ii) 1, 2, 4, 5, 10, 20 (iii) 1, 5, 25

(iv) 1, 2, 4, 11, 22, 44 (v) 1, 2, 4, 8, 16, 32, 64 (vi) 1, 2, 4, 14, 28

(2) (i) 2 x 2 x 3 x 3 (ii) 2 x 3 x 3 x 3 (iii) 3 x 3 x 3

(iv) 5 x 3 x 3 (v) 2 x 2 x 2 x 2 x 2 (vi) 2 x 41

(3) (i) 3 x 3 x 7 (ii) 3 x 3 x 5 (iii) 2 x 2 x 2 x 3 x 3

(iv) 2 x 3 x 3 x 3 (v) 2 x 19 (vi) 2 x 3 x 3 x 5

EXERCISE 2.5

(1) (i) 12 = 1, 2, 3, 4, 6, 12
18 = 1, 2, 3, 6, 9, 18

(ii) 10 = 1, 2, 5, 10
15 = 1, 3, 5, 15

(iii) 22 = 1, 2, 11, 22
44 = 1, 2, 22, 44

(iv) 8 = 1, 2, 4, 8
32 = 1, 2, 4, 8, 16, 32

(v) 36 = 1, 2, 3, 4, 9, 12, 18, 36
30 = 1, 2, 3, 5, 6, 10, 15, 30

(2) (i) 6 (ii) 14 (iii) 15 (iv) 25 (v) 18
(vi) 32 (vii) 25 (viii) 9 (ix) 11

(3) (i) 12 (ii) 9 (iii) 4 (iv) 12 (v) 24

EXERCISE 2.6

(1) 12 students (2) 6 books (3) 22 cm
(4) 6 cm (5) 2 (6) 16 litres (7) 5 days

EXERCISE 2.7

(1) (i) 75 (ii) 84 (iii) 20 (iv) 105 (v) 35
(2) (i) 126 (ii) 180 (iii) 180 (iv) 105 (v) 240
(vi) 72 (vii) 315 (viii) 90 (ix) 276 (x) 528

EXERCISE 2.8

(1) 560 roses (2) 150 seconds time (3) 108 bags
(4) 36 litres (5) 100

REVIEW EXERCISE 2

(1) (i) b (ii) a (iii) c (iv) b (v) a

(2) HCF = 3, LCM = 828 (3) HCF = 1, LCM = 1517

(4) 5 students (5) 30 friends

ANSWERS

EXERCISE 3.1

(1) **Like Fraction** (i), (iii), (vi) and (viii) **Unlike Fraction** (ii), (iv), (v) and (vii)

(2) (i) $<$ (ii) $>$ (iii) $>$ (iv) $<$ (v) $>$ (vi) $>$

(3) (i) $\frac{5}{7}, \frac{6}{7}, \frac{9}{7}$ (ii) $\frac{5}{9}, \frac{2}{3}, \frac{5}{6}$ (ii) $\frac{4}{15}, \frac{1}{3}, \frac{2}{5}$

(iv) $\frac{1}{6}, \frac{5}{12}, \frac{1}{2}, \frac{3}{4}$ (v) $\frac{9}{8}, \frac{5}{4}, \frac{13}{6}, \frac{7}{2}$ (vi) $\frac{5}{2}, \frac{7}{4}, \frac{7}{6}, \frac{5}{12}$

(4) (i) $\frac{3}{4}$ (ii) $\frac{2}{3}$ (iii) $\frac{3}{5}$ (iv) $\frac{1}{3}$ (v) $\frac{1}{2}$

EXERCISE 3.2

(1) **Unit Fraction** (i), (ii), (iv) and (ix), **Proper Fraction** (v) and (viii)
Improper Fraction (iii) and (vii), **Mixed Fraction** (vi) and (x)

(2) (i) $6\frac{1}{7}$ (ii) $7\frac{1}{4}$ (iii) $8\frac{2}{9}$ (iv) $2\frac{2}{6}$

(v) $5\frac{3}{5}$ (vi) $22\frac{1}{3}$ (vii) $7\frac{8}{11}$ (viii) $17\frac{1}{5}$

(3) (i) $\frac{43}{10}$ (ii) $\frac{17}{3}$ (iii) $\frac{13}{2}$ (iv) $\frac{23}{7}$

(v) $\frac{33}{4}$ (vi) $\frac{24}{13}$ (vii) $\frac{63}{8}$ (viii) $\frac{20}{7}$

EXERCISE 3.3

(1) (i) $1\frac{8}{9}$ (ii) $1\frac{2}{3}$ (iii) $1\frac{4}{5}$ (iv) $1\frac{11}{12}$ (v) $8\frac{5}{6}$

(vi) $8\frac{1}{12}$ (vii) $3\frac{11}{30}$ (viii) $3\frac{24}{35}$

(2) (i) $\frac{1}{3}$ (ii) $\frac{1}{8}$ (iii) $\frac{7}{15}$ (iv) $2\frac{1}{20}$ (v) $6\frac{3}{10}$

(vi) $\frac{17}{30}$

(3) (i) $\frac{7}{4}$ (ii) $\frac{4}{7}, \frac{2}{9}$ (iii) $\frac{1}{5}$ (iv) $\frac{2}{7}, \frac{3}{10}$

EXERCISE 3.4

(1) (i) $7\frac{1}{2}$ (ii) 3 (iii) $9\frac{9}{14}$

(2) (i) $\frac{1}{5}$ (ii) $\frac{8}{9}$ (iii) $\frac{10}{21}$ (iv) $\frac{5}{12}$
(v) $\frac{7}{16}$ (vi) $\frac{3}{8}$ (vii) 24 (viii) $6\frac{27}{12}$ (ix) 33

(3) (i) $\frac{7}{4}$ (ii) $\frac{3}{7}, \frac{2}{9}$ (iii) $\frac{1}{5}$ (iv) $\frac{2}{7}, \frac{3}{10}$ (v) $\frac{3}{7}, \frac{4}{7}$

EXERCISE 3.5

(i) $\frac{1}{2}$ (ii) 3 (iii) 3 (iv) $\frac{4}{7}$ (v) $1\frac{1}{8}$
(vi) $\frac{3}{5}$ (vii) $2\frac{4}{7}$ (viii) $\frac{3}{10}$ (ix) $5\frac{5}{6}$ (x) $4\frac{2}{3}$
(xi) $2\frac{1}{5}$ (xii) $\frac{170}{249}$ (xiii) 9 (xiv) $\frac{1}{12}$ (xv) $\frac{4}{15}$

EXERCISE 3.6

(1) $11\frac{3}{4}$ litres of milk **(2)** $\frac{7}{30}$ cm long **(3)** 6 years old
(4) $4\frac{3}{10}$ metres **(5)** 9 litres **(6)** 27 metres **(7)** $37\frac{1}{2}$ bags

REVIEW EXERCISE 3

(1) (i) $8\frac{2}{8}$ (ii) $5\frac{2}{3}$ (iii) $4\frac{3}{5}$ (iv) 8

(2) (i) $\frac{44}{5}$ (ii) $5\frac{29}{8}$ (iii) $\frac{52}{7}$ (iv) $\frac{11}{2}$

(3) (i) $\frac{3}{8}, \frac{5}{8}, \frac{9}{8}$ (ii) $\frac{1}{4}, \frac{2}{3}, \frac{5}{6}$ (iii) $\frac{7}{6}, \frac{6}{4}, \frac{5}{2}, \frac{8}{3}$
(iv) $\frac{3}{11}, \frac{2}{7}, \frac{5}{11}, \frac{4}{5}$

(4) (i) $\frac{13}{6}, \frac{11}{6}, \frac{7}{6}$ (ii) $\frac{3}{5}, \frac{2}{3}, \frac{5}{6}$ (iii) $\frac{4}{15}, \frac{3}{10}, \frac{9}{20}, \frac{4}{5}$
(iv) $\frac{4}{3}, \frac{5}{7}, \frac{3}{5}, \frac{1}{3}$

(5) (i) $\frac{5}{7}$ (ii) $\frac{6}{11}$ (iii) $\frac{5}{2}$ (iv) $\frac{21}{6}$

(6) (i) $1\frac{1}{10}$ (ii) $2\frac{1}{9}$ (iii) $1\frac{9}{10}$ (iv) $5\frac{1}{6}$

(7) (i) $\frac{1}{4}$ (ii) $\frac{2}{5}$ (iii) $1\frac{1}{6}$ (iv) $\frac{1}{6}$

(8) (i) 6 (ii) $3\frac{3}{4}$ (iii) $\frac{336}{735}$ (iv) $2\frac{2}{5}$

(9) (i) $\frac{1}{30}$ (ii) $1\frac{1}{5}$ (iii) $4\frac{2}{5}$ (iv) $4\frac{4}{5}$

(10) $2\frac{5}{6}$ (11) 5 balloons (12) $\frac{1}{2}$ metre (13) $\frac{19}{28}$ litres

EXERCISE 4.1

(2) (i) One (ii) Three (iii) Two
(iv) Two (v) Three (vi) One

(3) (i) 4 hundredths = $\frac{4}{100}$ = 0.04 (ii) 8 tenths = $\frac{8}{10}$ = 0.8

(iii) 2 thousandths = $\frac{2}{1000}$ = 0.002 (iv) 1 hundred = 100
2 hundredths = $\frac{2}{100}$ = 0.02

(v) 4 tens = 40
9 hundredths = $\frac{9}{100}$ = 0.09

(vi) 3 tens = 30
7 hundredths = $\frac{7}{100}$ = 0.07

(4) (i) Place value of 5 = 5 hundreds = 500
Place value of 7 = 7 tens = 70
Place value of 5 = 5 ones = 5
Place value of 1 = 1 tenths = 0.1

(ii) Place value of 0 = 0 ones = 0
Place value of 5 = 5 tenths = 0.5
Place value of 3 = 3 hundredth = 0.03
Place value of 4 = 4 thousandths = 0.004

(iii) Place value of 1 = 1 tens = 10
Place value of 8 = 8 ones = 8
Place value of 9 = 9 tenths = 0.9
Place value of 7 = 7 hundredth = 0.07
Place value of 9 = 9 ones = 9
Place value of 2 = 2 hundredth = 0.02

(iv) Place value of 9 = 9 ones = 9
Place value of 0 = 0 tenths = 0.0
Place value of 2 = 2 hundredth = 0.02

(v) Place value of 7 = 7 tens = 70
Place value of 5 = 5 ones = 5
Place value of 8 = 8 tenths = 0.8
Place value of 4 = 4 hundredth = 0.04

(vi) Place value of 5 = 5 tens = 50
Place value of 1 = 1 ones = 1
Place value of 1 = 1 tenths = 0.1
Place value of 5 = 5 hundredth = 0.05

EXERCISE 4.2

(1) (i) 0.01 (ii) 0.5 (iii) 0.23 (iv) 0.431 (v) 2.31
(vi) 1.7 (vii) 0.029 (viii) 5.72

(2) (i) 0.28 (ii) 10.5 (iii) 4.5 (iv) 0.75 (v) 0.26
(vi) 0.375 (vii) 0.76 (viii) 0.6

(3) (i) $\frac{3}{10}$ (ii) $1\frac{7}{20}$ (iii) $12\frac{37}{100}$ (iv) $\frac{54}{125}$ (v) $25\frac{1}{2}$
(vi) $2\frac{8}{25}$ (vii) $\frac{9}{20}$ (viii) $135\frac{1}{5}$

EXERCISE 4.3

(1) (i) 0.77 (ii) 0.67 (iii) 4.76 (iv) 35.6 (v) 1.77
(vi) 41.07 (vii) 1.6 (viii) 22.6 (ix) 81.011 (x) 123.726

(2) (i) 0.6 (ii) 0.23 (iii) 7.32 (iv) 0.67 (v) 0.98
(vi) 1.78 (vii) 8.99 (viii) 14.95 (ix) 32.086 (x) 12.036

EXERCISE 4.4

(1) (i) 1.89 (ii) 2.5 (iii) 173.2 (iv) 854.6 (v) 2235.42
(vi) 32.7 (vii) 1872 (viii) 1265 (ix) 21.25 (x) 102.7
(xi) 237.93 (xii) 20.174 (xiii) 130.08 (xiv) 34.79 (xv) 158.4

EXERCISE 4.5

(1) (i) 2.85 (ii) 2.34 (iii) 0.36 (iv) 3.22 (v) 0.52
(vi) 2.55 (vii) 1.57 (viii) 0.36 (ix) 2.81 (x) 11.41
(xi) 13.45 (xii) 5.39 (xiii) 48.1 (xiv) 3.37 (xv) 8.01

EXERCISE 4.6

(1) Rs 851.05 (2) 21.52 kg (3) Rs 67.25
(4) 6.073 (5) 21 (6) 176.8 kg
(7) 120 kg (8) 2.75 m (9) 11.75 kg

REVIEW EXERCISE 4

(1) (i) 5 thousandths = $\frac{5}{1000}$ = 0.005 (ii) 1 tens = 10
9 tenths = $\frac{9}{10}$ = 0.9
(iii) 7 hundredths = $\frac{7}{100}$ = 0.07

(2)	(i)	3.21	(ii)	0.175	(iii)	4.75	(iv)	3.375
(3)	(i)	$1\frac{27}{50}$	(ii)	$\frac{7}{20}$	(iii)	$13\frac{7}{10}$	(iv)	$\frac{69}{200}$
(4)	(i)	4.99	(ii)	0.19	(iii)	40.97	(iv)	1.05
(5)	(i)	32.5	(ii)	175.5	(iii)	3525.2	(iv)	82.24
(6)	(i)	1.57	(ii)	0.36	(iii)	2.87		

(7) 208 m and 12.5 m (8) 13.5 litres

EXERCISE 5.1

(1)	(i)	5000 m	(ii)	14000 m	(iii)	20000 m
(2)	(i)	1700 cm	(ii)	3200 cm	(iii)	5400 cm
(3)	(i)	150 mm	(ii)	190 mm	(iii)	300 mm
(4)	(i)	400 cm, 4000 mm	(ii)	1000 cm, 10000 mm		
	(iii)	3500 cm, 35000 mm	(iv)	6400 cm, 64000 mm		
	(v)	8300 cm, 83000 mm	(vi)	9800 cm, 98000 mm		

EXERCISE 5.2

(1)	(i)	13800 m	(ii)	38 km 360 m	(iii)	81 km 822 m
	(iv)	59 km 89 m	(v)	168 m 49 cm	(vi)	110 cm 88 mm
	(vii)	118 m 30 cm	(viii)	276 km 495 m	(ix)	357 km 919 m
(2)	(i)	1950 m	(ii)	3m 59 cm	(iii)	2 m 60 cm
	(iv)	557 m 40 cm	(v)	50 km 750 m	(vi)	51 km 748 m
	(vii)	194 m 11 cm	(viii)	46 cm 9 mm	(ix)	26 cm 8 mm

EXERCISE 5.3

(1) (i) 2 m (c) (ii) 30 m (c) (iii) 165 km (d)

(2)	1 m 48 cm	(3)	1157 m	(4)	79 cm	(5)	1 cm 17 mm
(6)	17 m	(7)	350 m	(8)	150 cm	(9)	130 m

EXERCISE 5.4

(1)	(i)	16241 g	(ii)	11 kg 300 g	(iii)	18 kg 21 g
	(iv)	10 kg 93 g	(v)	89 kg 765 g		
(2)	(i)	3 kg 750 g	(ii)	2 kg 17 g	(iii)	4502 g
	(iv)	22 kg 520 g	(v)	5 kg 68 g		

EXERCISE 5.5

(1) (i) (a) (ii) (c) (iii) (a) (iv) 5 kg (c)

(2) 162 kg 100 gm (3) 34 kg 750 g (4) 22 kg 550 g (5) 1143 kg 250 g

EXERCISE 5.6

(1) (i) 17 ℓ 425 ml (ii) 10815 ml (iii) 54 ℓ 676 ml
(iv) 2220 ml (v) 58 ℓ 532 ml

(2) (i) 106 ℓ (ii) 44 ℓ 185 ml (iii) 256 ml
(iv) 2 ℓ 845 ml (v) 21 ℓ 437 ml

EXERCISE 5.7

(1) (i) 4 ℓ (ii) 1 ℓ (iii) 500 ml
(iv) 4 ℓ (v) 140 ml (vi) 5 ml

(2) 9 ml (3) 298 ℓ water needed (4) 150 ℓ

(5) 236 ℓ 125 ml (6) 499740 ml (7) 23 ℓ 230 ml (8) 19 ℓ 250 ml

EXERCISE 5.8

(1) (i) 60 months (ii) 102 months (iii) 57 months
(iv) 122 months (v) 188 months (vi) 250 months

(2) (i) 90 days (ii) 102 days (iii) 260 days
(iv) 73 days (v) 328 days (vi) 75 days

(3) (i) 56 days (ii) 178 days (iii) 125 days
(iv) 210 days (v) 250 days (vi) 289 days

EXERCISE 5.9

(1) (i) 76 minutes 18 seconds (ii) 85 minutes 59 seconds
(iii) 59 hours 30 minutes (iv) 59 hours 35 minutes

(2) (i) 11 minutes 10 seconds (ii) 20 minutes 10 seconds
(iii) 13 hours 34 minutes (iv) 31 hours 20 minutes

EXERCISE 5.10

(1) 48 minutes 55 seconds (2) 7 hours 45 minutes

(3) 10 minutes 42 seconds (4) 2 hours 25 minutes

(5) 14 minutes 24 seconds

REVIEW EXERCISE 5

(1) (i) (b) (ii) (b) (iii) (c) (iv) (b)

(3) (i) 6 km (ii) 3.5 km **(4)** (i) 15000 m (ii) 3000 m

(5) (i) 49 km 27 m (ii) 87 m 41 cm (iii) 26 ℓ 500 mℓ (iv) 83 kg 340 g

(6) (i) 36 km 7 m (ii) 28 m 53 cm (iii) 8 ℓ 250 mℓ (iv) 41 kg 313 g

EXERCISE 6.1

(1) (i) 3 cm, 5.6 cm, 3.5 cm, 3.5 cm (ii) 5.4 cm, 5.4 cm, 2.6 cm, 3.3 cm
(iii) 2.7 cm, 2.7 cm, 3.5 cm, 3.5 cm

(2) (ii) 7.9 cm (iii) 9.1 cm (iv) 10 cm (v) 10.6 cm

EXERCISE 6.2

(2) (i) 4.2 cm (ii) 4.7 cm (iii) 4.3 cm

EXERCISE 6.3

(1) West and East **(2)** North and South **(3)** Vertical **(4)** Horizontal

EXERCISE 6.4

(1) (i), (iv), (vi) and (viii) are parallel lines
(ii), (iii), (v) and (vii) are non-parallel lines

EXERCISE 6.6

(1) (i) Vertex B, Arms $\overrightarrow{BA}$ and $\overrightarrow{BC}$ (ii) Vertex Q, Arms $\overrightarrow{QP}$ and $\overrightarrow{QR}$
(iii) Vertex W, Arms $\overrightarrow{WX}$ and $\overrightarrow{WY}$

(2) (i) AOB (ii) AEF (iii) JKL

EXERCISE 6.7

(1) (iii), (iv) and (v) are right angles **(2)** (i), (ii), (v) and (vi) are right angles

EXERCISE 6.8

(1) (i) right (ii) acute (iii) obtuse (iv) acute (v) obtuse (vi) right

EXERCISE 6.9

(1) 30° **(2)** 40° **(3)** 40° **(4)** 28° **(5)** 43°
(6) 43° **(7)** 110° **(8)** 110° **(9)** 142°

EXERCISE 6.10

(1) (i) 43° acute angle (ii) 43° acute angle (iii) 70° acute angle
(iv) 155° obtuse angle (v) 90° right angle (vi) 155° obtuse angle

REVIEW EXERCISE 6

(1) (i) Ruler (ii) Set square (iii) Set square
(iv) Protractor (v) Compasses (vi) Dividers

(2) * H * (9) (i) 3 angles, ABD acute angle
CBD acute angle
ABC right angle

(ii) 6 angles, GDP acute angle, PDE acute angle,
GDE right angle, CDE obtuse angle,
CDG obtuse angle, CDP obtuse angle

(10) (i) 2 Squares, ABED and BCFE
(ii) 5 squares, ABHG, BCIH, HIFE, GHED, ACFD **(11)** (i) 3 triangles

EXERCISE 7.1

(1) (i) 5 students (ii) Pink (iii) Yellow
(iv) 20 students (v) 15 students (vi) 6 colours (vii) 85 students

(2) (i) 20 students (ii) Cricket (iii) 25 students
(iv) 4 games (v) Hockey (vi) 35 students (vii) 140 students

EXERCISE 7.2

(1) (i) Team D (ii) Team E (iii) No team
(iv) 10 seconds (v) 40 minutes (vi) 15 seconds

(2) (i) Thursday (ii) 10 acres (iii) 7 days (iv) 10 acres
(v) Monday and Friday (vi) 55 acres
(vii) 15 acres, 5 acres, 10 acres (viii) Monday, Friday

(3) (i) Math and Islamiyat (ii) 360 (iii) 70 marks (iv) 80 marks (v) Science

REVIEW EXERCISE 7

(1) (i) 80 rupees (ii) 120 rupees (iii) No (iv) 20 rupees (v) 6 litres

(2) (i) 3000 rupees (ii) 4000 rupees (iii) June
(iv) January (v) 17500 rupees (vi) 1500 rupees

(3) (i) 2 cm (ii) 6 cm (iii) 2 cm (iv) 6 cm (v) 4th and 5th days (vi) 5 times